Light and LIGHTING

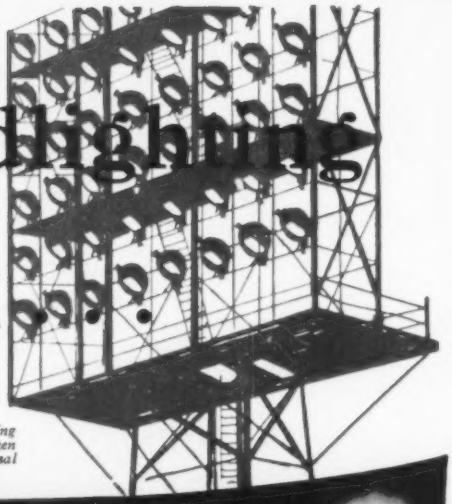
OCTOBER, 1958 · PRICE 2s. 6d.

tungsten
lighting
fittings

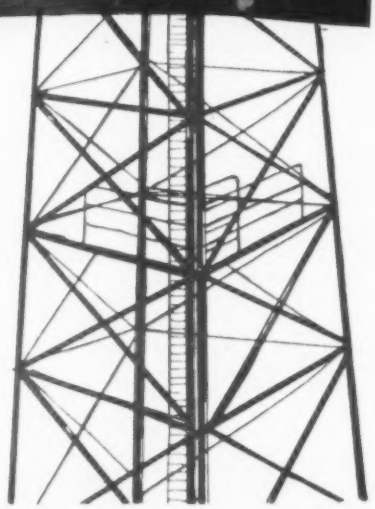
Hailware

HAILWOOD & ACKROYD LTD

New REVO floodlighting at Molineux



This action photograph showing Wolves playing Real Madrid under the new floodlighting was taken at 1/50 sec. at an aperture of f.11—i.e., a normal daylight exposure.



After exacting tests with floodlights of varied makes, Revo equipment was chosen to provide Wolverhampton with the finest football-ground floodlighting system in the country.

The four 146 ft. towers each support 48 Revo floodlights fitted with silvered-mirror reflectors and using Tungsten Filament Lamps, giving a total floodlighting load of 330 Kw. Facilities have been provided to increase the number of floodlights per tower to 60, giving a total load of 415 Kw.

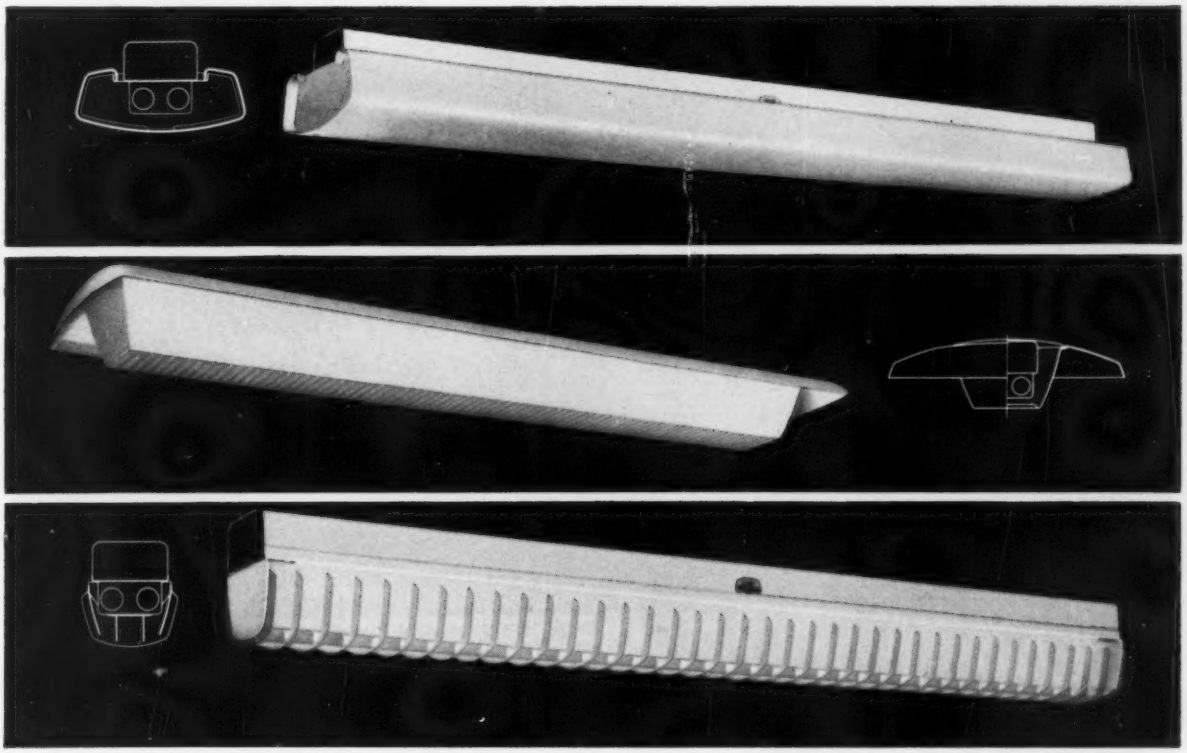
Revo equipment has been specified for some of the most important installations of public and industrial lighting throughout the world, and the Wolverhampton Wanderers Football Club scheme is yet another example testifying to the high quality and efficiency of Revo products.

REVO ELECTRIC COMPANY LTD., TIPTON, STAFFS.

Telephone: TIPTON 2828. · Telegrams: REVO, TIPTON.

Branches at London, Glasgow, Manchester, Newcastle-on-Tyne, Cardiff, Leeds, Belfast, Dublin.

3 new versatile atlas atlantic fittings



1 *SERIES 1B. Opal acrylic diffuser of soft diamond texture, with interchangeable coloured end plates.*

2 *SERIES 1C. One-piece acrylic moulded diffuser and canopy, underside ribbed for contrast.*

3 *SERIES 1E. Attractive "Twinluve" diffuser, with pearl finish polystyrene sections.*

More scope for design, faster installation, simpler maintenance . . . . that's the ATLAS ATLANTIC range of pre-assembled fluorescent fittings. There are now some 450 different styles and sizes from which to choose, and all with the same unique chassis design. This standardisation in basic construction, together with the wide variety of fittings, results in lower cost all round, and extends the applications of this one range to cover all industrial, commercial and general purpose lighting. Thus a "family" theme can be maintained throughout the largest installation, and the fittings and attachments quickly interchanged to conform with any functional alterations of the premises.

atlas leads in lighting

ATLAS LIGHTING LIMITED A subsidiary company of Thorn Electrical Industries Limited
255 Shaftesbury Avenue London WC2

We of The Benjamin Electric Ltd., are proud of our long association with the Electrical Industry and we offer our grateful thanks for all the help and encouragement received during the past fifty years. To our customers we are equally indebted for their co-operation during the same period. It is the aim and desire of our world-wide organisation on this our Golden Jubilee, to maintain and strengthen in future years the prestige of the industry of which we are part.

better lighting by BENJAMIN REG'D.

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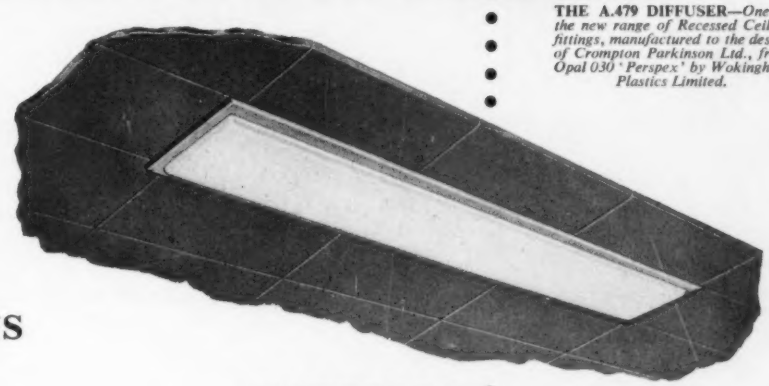
BIRMINGHAM: *5 Corporation Street, Birmingham 2. Tel. Midland 5197* · LEEDS: *49 Basinghall Street, Leeds. Tel. Leeds 25579*

BRISTOL: *Royal London Buildings, Baldwin Street, Bristol. Tel. Bristol 28406*

Smee's 128

Wokingham Plastics

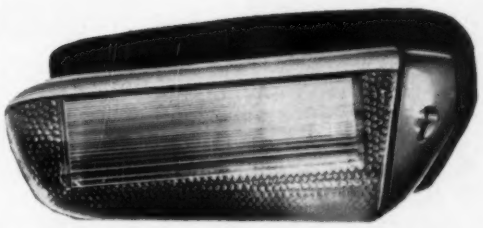
THE A.479 DIFFUSER—*One of the new range of Recessed Ceiling fittings, manufactured to the design of Crompton Parkinson Ltd., from Opal 030 'Perspex' by Wokingham Plastics Limited.*



SPECIALISTS IN ACRYLIC MOULDINGS AND FABRICATIONS

INTERIOR or PUBLIC LIGHTING FITTINGS

Specialization—the constant application of the finest technical knowledge and skill to the job in hand—is the answer to the need for lighting fittings that measure up to modern requirements of maximum dependability, plus fitness for purpose—*and* economy in costs. That is why the Wokingham Plastics Service is more and more in demand by those organisations whose reputation for efficiency is reflected in their choice of equipment.
May we serve you with the same certainty of your complete satisfaction? Get in touch with us NOW.



The New Revo "Sol-Dor" 140 watt Sodium Street Lighting Lantern No. C15154.
This complete Acrylic Bowl is manufactured from Clear and Opal Perspex—the special 'hammered' finish of the Clear portion and the expert machining of the Refractor Panels illustrate the specialised service offered by:—

TELEPHONE :
WOKINGHAM 700/701

WOKINGHAM PLASTICS LTD

DENTON RD. WOKINGHAM BERKSHIRE

A.I.D. APPROVAL No. 5079/43
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CONTRACTORS TO ADMIRALTY, AIR MINISTRY, POST OFFICE

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CLARENDON CROSS
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PROTECTAFIL

Over quarter of a million in use

Approved by the Arts Council of Industrial Design, British Electricity Authority, Australian Electricity Approval Board.

Specify PROTECTAFIL in your Street Lighting Fittings.

The Protectafil damps down both high and low frequency Vibration thereby protecting the delicate lamp filament from early damage. Saves many times its cost.

VIBRATION—WHAT DOES IT COST YOU ?

One aspect of industrial lighting which does not always receive its due consideration is that of lamp suspension, with the consequent frequent failure of lamps through vibration. Many thousands of pounds sterling are unnecessarily spent each year in lamp replacements.

Fit PROTECTAFIL
Britain's best ANTI-VIBRATOR LAMP FITTING

★ *Write for Catalogue L, and sample Protectafil.*

J. E. WILDBORE LTD

6-12 PETER STREET, OLDHAM

Telephone : MAin 4475 **Established 1908**

50 YEARS LIGHTING SERVICE

world famous glass

for exclusive lighting

Hiscock Appleby and co., ltd.

12/16 Holbein Place, Sloane Square, London, s.w.1

G.E.C.

AND

LUMENATED CEILINGS

GET TOGETHER

The success of the Lumenated Ceiling technique with its evenly-diffused and shadowless lighting is now well-known. A combined nation-wide service to market and apply this modern system has now been established by G.E.C. and Lumenated Ceilings Ltd. The joint research and production facilities thus provided will extend still further the scope of this brilliant new idea in architectural lighting.

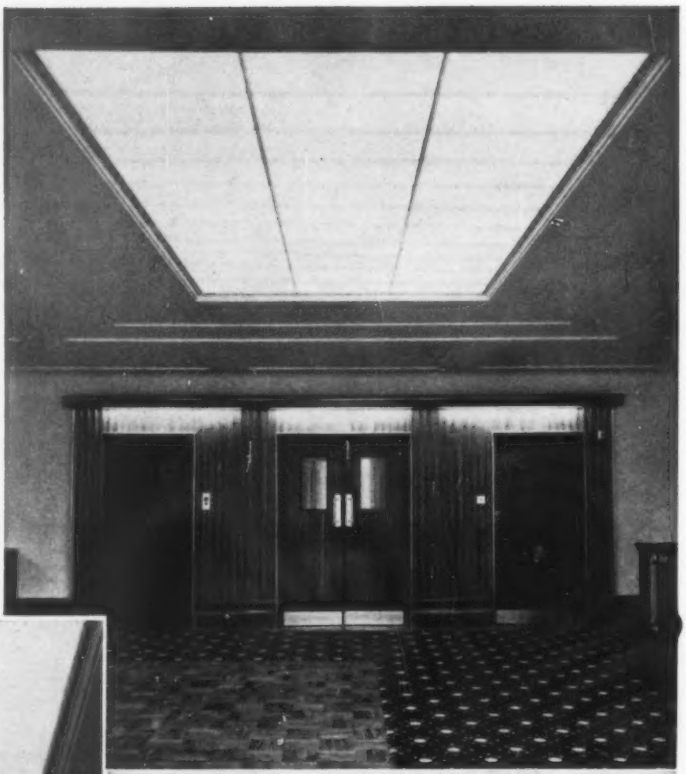
LUMENATED CEILINGS LIMITED
ALLIANCE HOUSE, CAXTON ST., SW1. TELEPHONE: ABBEY 7113

THE GENERAL ELECTRIC COMPANY LTD
MAGNET HOUSE, KINGSWAY, WC2. TELEPHONE: TEMple Bar 8000

TGA 611

A SPECIAL Erinoid polystyrene FOR LIGHTING FITTINGS

Erinoid *light-stabilised and light-diffusing* opal polystyrene has been specially developed for lighting fittings such as diffuser panels and louvres. This material diffuses but gives maximum light transmission. It is available in KLP (general purpose), 2CL (high molecular weight), HS (heat resistant) and 2CL/HS grades.



The entrance hall of The Equity and Law Life Assurance Society's new offices at St. Johns, Hazlemere, Bucks. The ceiling lighting has PLASMATIC* diffuser panels extruded in Erinoid light-stabilised polystyrene by Tube Lamination and Engineering Limited. Inset shows the ease with which these panels can be removed for cleaning.

**Registered Design No. 882725. Patent Application No. 37491/56.*

Erinoid polystyrene is manufactured by

STYRENE PRODUCTS LIMITED

AND IS AVAILABLE AS MOULDING POWDER, SHEET AND EXTRUDED SECTIONS

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V. 82 12″ diameter 200 w. 26s.8d. + 6s.0d. Tax

VENTURA

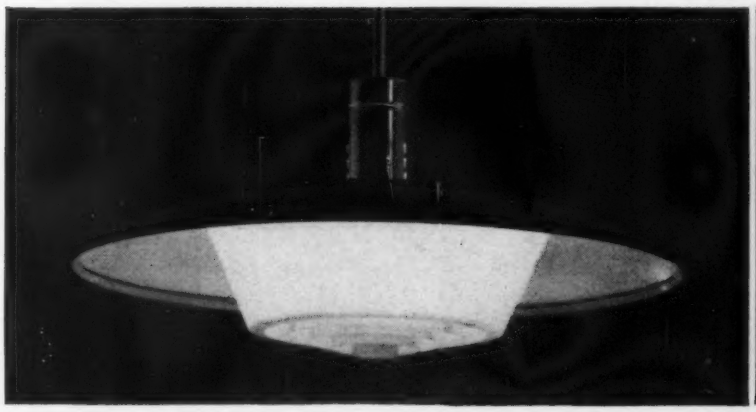
Designed by Paul Boissevain, Dip. Arch., M.S.I.A.

A series in translucent white opal plastic

On the school programme alone thousands of pounds have been saved by specifying Venturas – with high standards of quality and lighting efficiency maintained.

For full information, including data on the new units with reflectors for use with higher ceilings, ask for publication V.88.

Venturas are available from stock throughout the world.



THE MERCHANT ADVENTURERS LIMITED

16-43 PORTLAND ROAD LONDON W.11 TELEPHONE PARK 1221 (5 lines)

CHARIOT BRAND

80 YEARS SERVICE TO THE LIGHTING INDUSTRY
IN THE SUPPLY OF ILLUMINATING GLASSWARE

C. QUITMAN LTD

12A GOLDEN SQUARE · LONDON · W.1

TELEPHONE: GERRARD 4526/7

G.E.C.

POST-TOP DECORATIVE LANTERN

for STREET LIGHTING

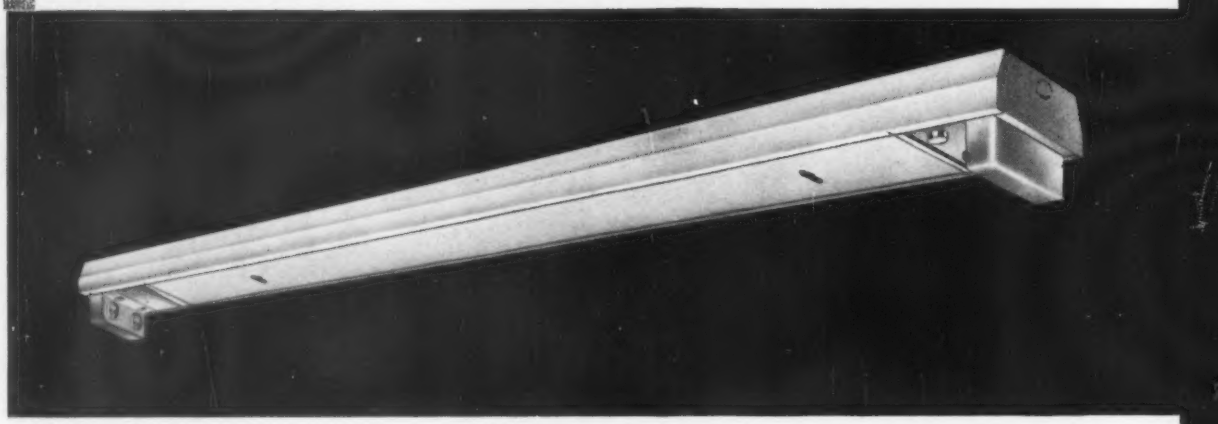
Among its many outstanding features are :—

- Tapered cylindrical "Perspex" body incorporating sealed-in "Perspex" refractor plates.
- All spinnings in aluminium.
- Smooth exterior for ease of cleaning.
- Tube operating gear housed within the lantern under the top "mushroom" shaped spinning.
- Handsome bronze finish to exterior metal components.

The G.E.C. Post-top decorative lantern has been designed for use with two 2 ft. 40W. Osram guaranteed fluorescent tubes and is intended for side road lighting. Light control is obtained by two vertical mounted "Perspex" refractor plates — a unique feature.

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Announcing *The Revolutionary EKCO



Over 200 fluorescent fittings from this Basic Spine

4 ft., 5 ft. and 8 ft.—Single & Twin Tube

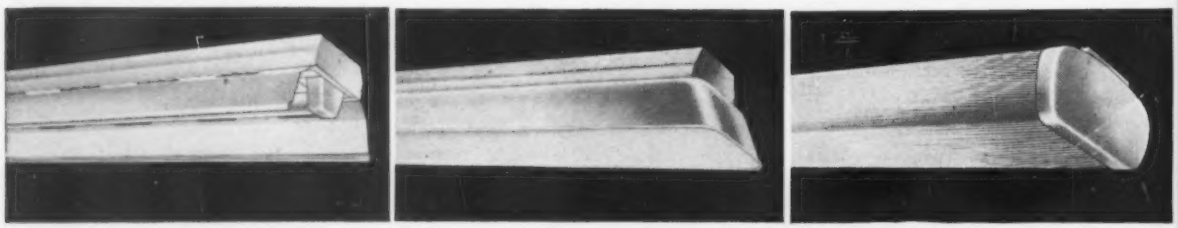
An entirely new range of Fluorescent Lighting Fittings, produced by experts with many years of experience, to combat the ever-rising costs of installation and maintenance.

The **Essex Range** prices are very competitive with those of any fittings of the same standard, but only the **Essex Range** has all the precision built-in refinements such as:—

Detachable control gear tray, quick-fix reflectors and diffusers, heavy duty bi-pin lampholders permitting lamping from one position, no projecting screwheads on spine, and many others.

Ask for a copy of the **Ekco Essex Range** Catalogue and see how good fluorescent lighting fittings can be.

* ***Installation and maintenance cost halved.***
* ***Assembly by one man in two minutes.***
* ***Full range of quick-fix metal and plastic reflectors with open or closed ends.***
* ***Modern diffusers with coloured endplates — quickly detachable for ease of maintenance.***



EKCO-ENSIGN ELECTRIC LIMITED

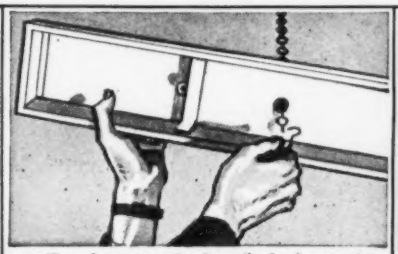
SALES OFFICES, ILLUMINATING ENGINEERING DEPTS., SHOWROOMS AND DEPOTS IN

Essex Range

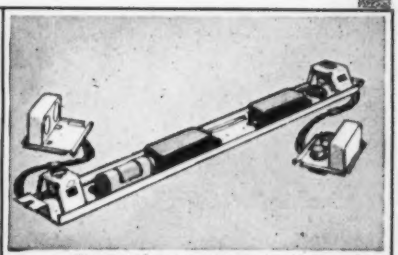
PATENT APPLIED FOR

Fluorescent Fittings

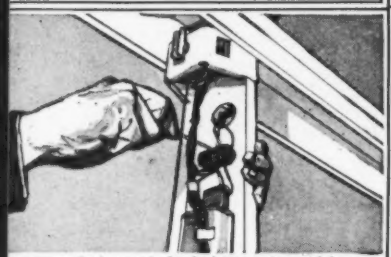
INSTALLATION & MAINTENANCE A ONE-MAN JOB!



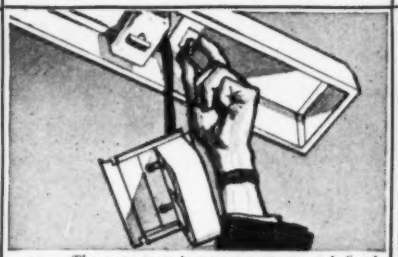
1 *First the empty spine is easily fixed to conduit, chain, universal suspension or ceiling. The 5ft. spine weighs only 7 lbs.*



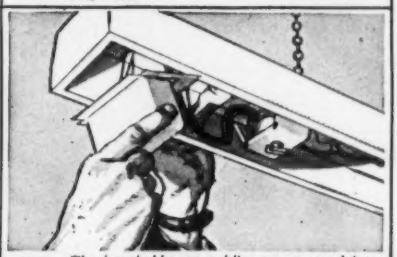
2 *The control gear tray is already wired complete with lampholder assemblies. The Switchstart tray for a single tube 80W. fitting weighs only 9 lbs.*



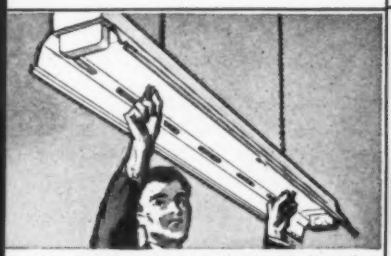
3 *Gear tray is hooked into spine and hangs vertically leaving both hands free to make connections.*



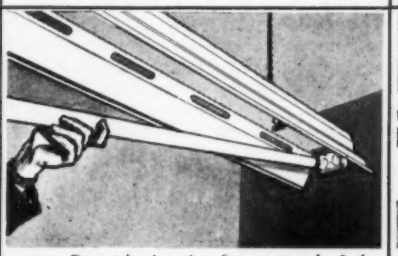
4 *The gear tray is now swung up and fixed securely in position by means of the captive wing nut.*



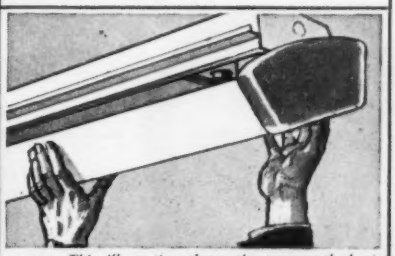
5 *The lampholder assemblies are engaged into the ends of the spine and slid into position. No screws or tools are required.*



6 *Reflectors (or coverplates) are instantly attached to the spine by two quick-fix turn-buttons.*



7 *Easy tube insertion from one end of the fitting. The fitting is now ready for use.*



8 *This illustration shows the easy method of diffuser attachment. A projecting coverplate is used, the diffuser is hung on to one side, is swung up and similarly engaged on the other side.*

The Economy Range If price is your problem, then the **Economy Range** of Fluorescent Lighting Fittings provides the answer. Please turn to page xiii for details.

45 ESSEX STREET, STRAND, LONDON, W.C.2. TEL: CITY 8951

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The design and construction of the synchronous motor provide extraordinary stability and a high degree of self starting efficiency is ensured.

The accuracy and reliability you demand are revealed in

the Anatomy of a Horstmann Time Switch

This is the Horstmann Type K Mark II plug-in pattern Time Switch, with synchronous motor driven movement and with switchgear of 20 amps capacity at 200/250 volts, 50 cycles. Models to meet other requirements can be supplied to order.

Capacity at 250v=50 amps.

To meet many different needs, Horstmanns make a large range of Time Switches, but two major requirements are common to all. Time Switches must be *accurate* and they must be *reliable*—able to operate unfailingly under varying conditions of service with scarcely any attention. Horstmanns build these essential qualities into their instruments by employing high grade materials, skilled precision craftsmanship and—half the secret—over 50 years of experience in design and manufacture.

Horstmann Time Switches are used extensively for the control of street lighting, shop window lighting, electric signs, special tariffs —in fact wherever electric current needs to be controlled without human intervention. Such superior instruments compare favourably in price with other time switches but quality has not been sacrificed for cheapness. The best Time Switches are the cheapest in the long run, and Horstmann Time Switches run for a *very* long time.

Full details about all models sent on request.

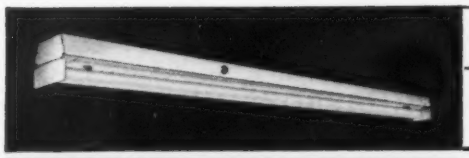
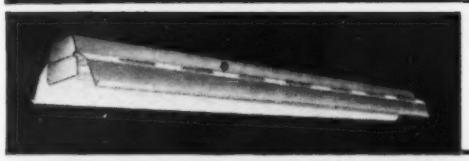
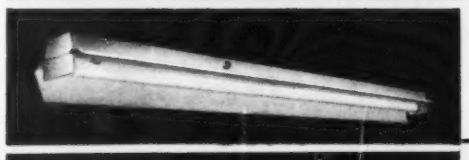
HORSTMANN TIME SWITCHES FOR CONTROLLING THINGS ELECTRICAL

HORSTMANN

THE HORSTMANN GEAR CO LTD. BATH. SOMERSET

EKCO *answers your cost problems* with the Economy Range

Fluorescent Fittings *Complete with Tubes*

	Fittings	5 ft. Cat. Nos.	List Price incl. tube(s) & P.T.	4 ft Cat. Nos.	List Price incl. tube(s) & P.T.
	Battens				
	Single	F51081	£ 6.10.0	F41081	£5.11.0
	Twin	F52081	£10.16.0	F42081	£8.15.0
	Reflectors				
	Single	F51082	£ 7.12.0	F41082	£6.12.0
		F51083	£ 7.12.0	F41083	£6.12.0
	Twin	F52082	£11.18.0	F42082	£9.16.0
		F52083	£11.18.0	F42083	£9.16.0
	Angle Reflectors				
	Single	F51088	£ 7.12.0	F41088	£6.12.0
	Twin	F52088	£11.18.0	F42088	£9.16.0
	Diffusers				
	Single	F51381	£13.14.1 incl. £1.16.9 P.T.	F41381	£12. 5.5 incl. £1.14.10 P.T.
	Twin	F52381	£18.13.7 incl. £2.4.11 P.T.	F42381	£16. 0.8 incl. £2.0.6 P.T.

Available in both single and twin tube, 4 ft. and 5 ft. sizes with Switchstart control gear.
Complete with either White or Warm White Tubes.

AND ALSO THE '035' BATTENS

	Cat. No.	Size	List Price incl. tube(s) & P.T.	Cat. No.	Size	List Price incl. tube(s) & P.T.
	F51035	5 ft.	£5. 5.0	F41035	4 ft.	£4.11.0
	F52035*	5 ft.	£9.13.0	F21035	2 ft.	£3.10.0

* This is the new twin tube fitting. All others in '035' Battens are single tube.

The list prices include fluorescent tube(s), purchase tax on tube(s) and on diffuser fittings where applicable.

EKCO-ENSIGN ELECTRIC LTD., 45 ESSEX STREET, STRAND, LONDON, W.C.2. Telephone: CITY 8951

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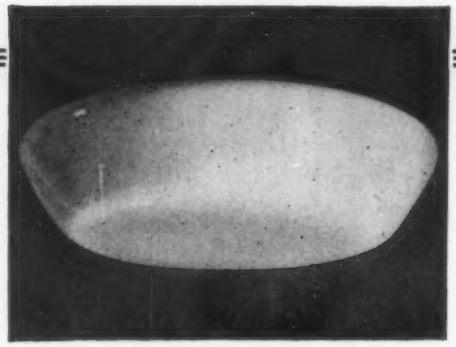
EL. 61

SLR

DESIGNED by Designers for Designers



An entirely new range of flashed opal ceiling fittings with cadmium plated "invisible" metalwork introduced by

S.L.R. ELECTRIC LTD.

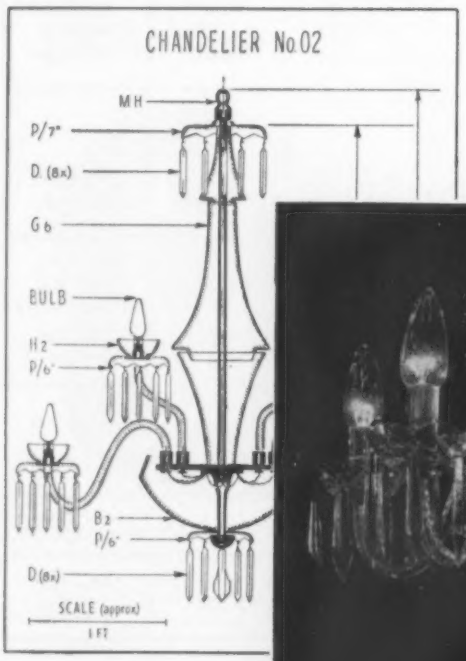
Four sizes are available from stock for immediate delivery:—

C90	—	10″ dia. × 4″ deep	—	for 60 watt pearl lamp.
C91	—	12″ dia. × 4″ deep	—	for 2 × 60 watt pearl lamps.
C92	—	14″ dia. × 4⅜″ deep	—	for 2 × 75 watt pearl lamps.
C93	—	16″ dia. × 4¾″ deep	—	for 2 × 100 watt pearl lamps.

Our address is

WELBECK WORKS, WELBECK ROAD, SOUTH HARROW, MIDDX.

Phone: **BYRON 3273-5** ***Grams:*** **ESELAR HARROW**



Waterford Chandeliers

Beautifully hand cut from full lead crystal, Waterford Chandeliers are available in sizes suitable for modern interiors.
Chandeliers can be supplied from stock in original Waterford designs or in new designs in the highest Waterford tradition.
Waterford Glass are also glad to make up chandeliers to architects' own specifications.
Particulars of this service will be sent on request.

WATERFORD GLASS LIMITED, WATERFORD, IRELAND

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J. WUIDART & CO. LTD., 15 RATHBONE PLACE, LONDON, W.1

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The Largest and most experienced designers and manufacturers of Road Signs and equipment

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Road Traffic Signs, all finishes
Illuminated Guardposts
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Light and LIGHTING

Vol. 51. No. 10. October, 1958

Published by The Illuminating Engineering Publishing Co. Ltd. on the 1st of each month at 32, Victoria Street, London, S.W.1. Telephone: ABBey 7553. Subscription rate 30s. per annum.

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Levels of Illumination

A COMPLETE revision of the American IES recommended levels of illumination for a large number of specific purposes has been made in consequence of new data yielded by the laboratory experiments of Dr. Richard Blackwell of the University of Michigan. The new recommendations were published in the August issue of *Illuminating Engineering*, together with a prefatory article by C. L. Crouch summarising Blackwell's experiments and results. It goes without saying that this event will excite considerable interest on this side of the Atlantic. Blackwell's work—which has been going on for eight years—and the interpretations put upon it in the U.S.A. will have to be studied carefully before they can be fairly appraised. Blackwell himself "measured" the illumination required by each of 56 practical tasks if his performance criteria were to be satisfied, and the new "footcandle tables" have been prepared by comparing the practical tasks to which they relate with the measured "sample" tasks. It appears that the most difficult of these sample tasks were found to require upwards of 10,000 lm/ft². Some compromise has been effected in the schedule of "applications," for we notice that this contains no task for which more than 2,500 lm/ft² is recommended. Our American friends now look forward to the discovery of how much more light is needed for "older eyes" and for eyes having otherwise subnormal vision.

Notes and News

AT the opening meeting of the 1958-59 session of The Illuminating Engineering Society which is to take place at the Royal Institution on Tuesday, October 14, Mr. E. B. Sawyer will hand over the presidential office to Mr. C. C. Smith.

Though quite a number of previous presidents of the IES have been noted authorities on street lighting, Charles Smith is the first municipal lighting engineer to become President of the Society. He is City Lighting Engineer of Liverpool, which is one of the most important street lighting appointments in the country. Since he was appointed in 1948 his influence on street lighting development has been felt well beyond the boundaries of his own city.

C. C. Smith, IES President 1958-59

Brought up in Wallasey, he served an apprenticeship with the Liverpool Corporation Electric Supply Department, with whom he was still serving when he was called up with the Supplementary Reserve in 1939. During the war he saw service with the Royal Engineers in India, Iraq and Persia, rising to the rank of Major. After the war he rejoined the Electric Supply Department in Liverpool; he was appointed Deputy City Lighting Engineer in 1946 and to his present position in 1948. He is a past-chairman of the IES Liverpool Centre, a past-president of the APLE and a past-chairman of their Lancs. and Yorks. Section. He was made a vice-president of the IES in 1956.

As next year is the Golden Jubilee year of the IES Mr. Smith takes office with the prospect of a very heavy year ahead of him. Every president takes on two lots of work during his year of office; Charles Smith is almost certainly going to find himself with two lots plus. In inviting him to be president at this time the IES Council must have had every confidence that he could tackle the job and we know we may safely assure Mr. Smith that every member of the IES shares this confidence. The work may be hard, but we trust that he will find many compensations and we wish him a very happy and successful year.

During the past year Mr. Sawyer has successfully steered the IES along the course set by recent presidents and has given much time to society activities in London and in the centres even though he must have had a very busy time in launching the new British Lighting Council at the same time.

Russian Lighting Code

An English translation of the new Russian Lighting Code, as published recently in *Svetotechnika*, together with a translation of a paper in the same journal describing some of the underlying experimental work, has been prepared by the Pergamon Institute, of 4 Fitzroy Square, London, W.C. The cost of preparing these translations is ordinarily very high. However, we understand that the Pergamon Institute will supply a copy of the translations to interested bodies and individuals at a comparatively modest cost. The actual price must necessarily depend upon the number of copies over which the cost of translation can be spread. There are unusual features about the Code which make it of special interest, and all who wish to have a copy are advised to get in touch with the Pergamon Institute at the address given above.

Occupational Hygiene

The British Occupational Hygiene Society is arranging a conference on Vision, Lighting and Colour on Tuesday and Wednesday, 11 and 12 November, 1958, at the London School of Hygiene.

On the first day papers will be presented on:— (1) The Physiology of the Visual System and Colour Vision, by Professor W. D. Wright, of Imperial College; (2) The Subjective Aspects of Comfort and Discomfort in Lighting, and the Problem of Visual Fatigue and its Measurement, by R. G. Hopkinson and J. B. Collins, of the Building Research Station; (3) The Rating of Visual Tasks, by H. C. Weston, of the Medical Research Council; and (4) Modern Methods of Artificial Lighting, by M. W. Pierce, of the G.E.C. Ltd.

On the morning of the second day there will be a paper entitled Colour in Factory Buildings, by Mr. L. V. Jones, of the Colour Advisory Department of

ICI, and in the afternoon a visit will be paid to the factory of the Paints Division, ICI, at Slough.

The conference is open to non-members of the Society on payment of a registration fee of one guinea. Those who wish to attend should write to the Honorary Scientific Secretary, Dr. D. Turner, The Associated Ethyl Company Limited, Ellesmere Port, Cheshire.

Shop Lighting Campaign

The British Lighting Council has launched a shop lighting campaign for which it has produced a number of leaflets giving facts and figures about shop lighting and its effect on sales and hence on profits. Conferences are being held in various parts of the country to inaugurate the campaign and to explain to the electrical trade the ways in which support can be given. The slogan of the campaign is " Better Lighting, Better Sales ". One of the leaflets which is available (Shop Lighting Facts) gives very well put arguments for better shop lighting. We particularly liked the one which says that good lighting helps to keep the assistants cheerful and energetic. There can be little doubt that a well lit shop does attract customers, and having stopped to think about it we think it is also probably true that it is in the worst lit shops that one gets the worst service. It is a help if one can see where the shop assistant is when one enters a shop; it helps even more if the assistant can see you. However effective it may be it is a little disconcerting to have to stand in the middle of a shop and shout " help " when you want to be served (and we have done this in many well known stores); the shop with no dark corners for either staff or customers to hide in must surely be a better proposition than many of the dim interiors that we see. Not that lighting is the complete answer; but it helps.

IES Programme

The IES programme of meetings for the 1958-59 session has recently been issued, and the first comment one must make is on the design of the booklet itself. What a contrast to the skimpy sort of things of previous years! As we have mentioned before, the IES is making a good show of improving the design of all its printed matter and this last example is another step in the right direction.

Once again the London programme is announced only for the first half of the session as the Papers Committee will not include any paper which has not been through the refereeing machinery. That this policy is a sound one was obvious from the papers given during the previous session, in which there was not one paper which did not come up to the standard we expect. The 1958-59 session shows equal promise. It has become accepted that the opening meeting at which the new President makes his debut should be held at the Royal Institution; it should not, however, be overlooked that to hold a meeting at the RI is an honour for the body concerned, and we are very glad to see that the IES is again so honoured. The London meetings include the fifth Trotter-Paterson Memorial Lecture which is to be given by Sir Solly Zuckerman; the list of T-P lecturers is becoming a very distinguished one of which the IES can be rightly proud.

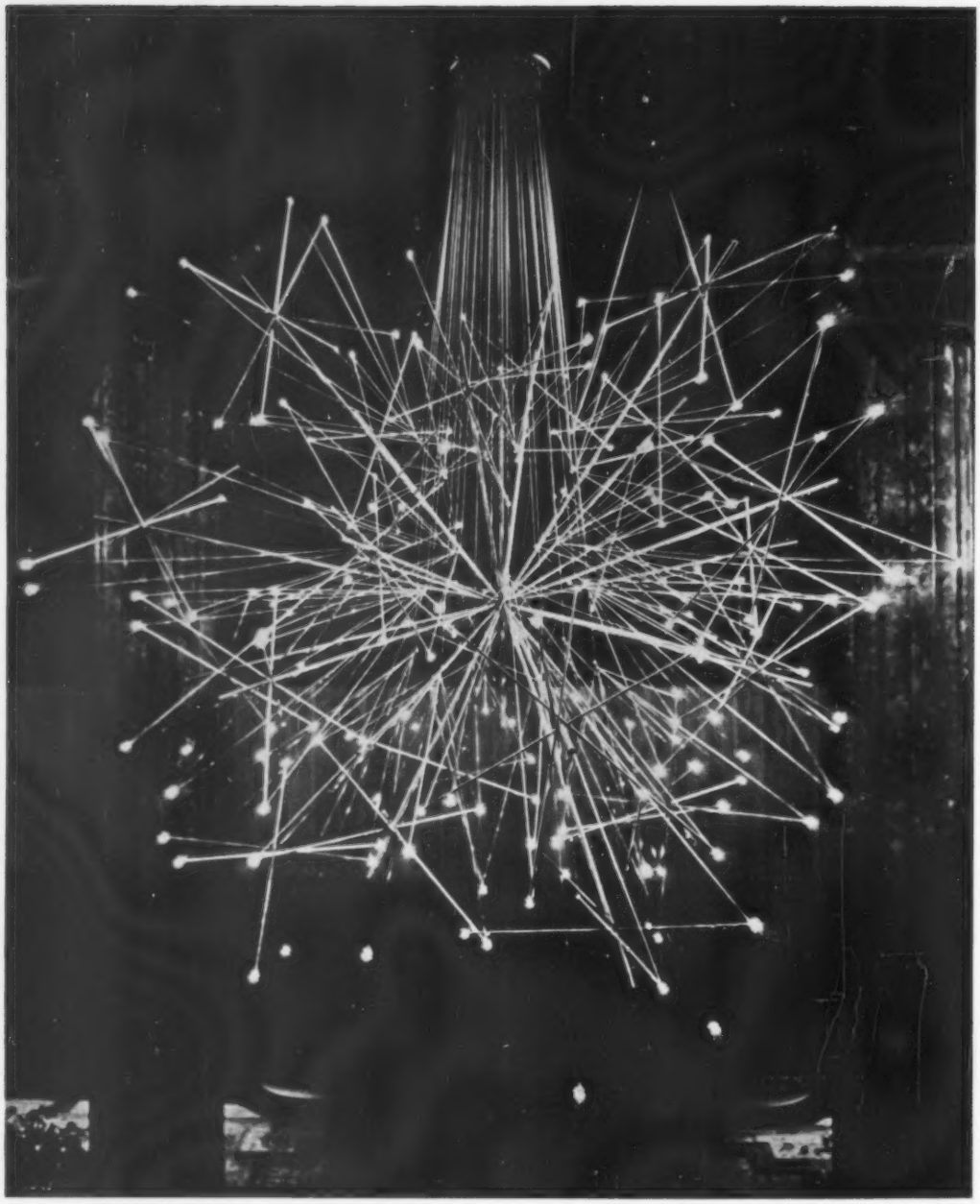
Meetings to be held in the Centres range over a number of interesting subjects and we are particularly pleased to see quite a few new lecturers. Once again the Manchester Centre gives a lead in breaking new ground and are to be congratulated on their first lecture which is to be by Sir Gordon Russell, Director of the Council of Industrial Design.

Items arranged specially as Golden Jubilee events are not obvious from the present programme, but we understand that a complete programme of these for 1959 is to be issued later in the year. However, it is to be noted that every centre is arranging some kind of function on February 9 which will be linked by telephone line to the GOLDEN JUBILEE COMMEMORATION DINNER at the Criterion Restaurant in London so that the speeches at the latter can be heard in all the Centres. Details of the London dinner with forms of application for tickets will no doubt be circulated to IES members in due course, but we have in the meantime been authorised to make the following announcement: — The cost of tickets will be £2 10s., which includes wines; members may bring male guests only. Application for tickets may be made now—indeed early application is advised.

Maintenance

Some years ago in a contribution to our feature on floodlighting of football grounds, Kenneth Wolstenholme, admitting to a fiendish sense of humour, said he was awaiting the occasion when all the lights fuse at once during an exciting moment in the game. We can't recall that this has happened but chaos appears to have resulted in a recent league game because the lights were not properly adjusted. It would seem that " maintenance " had been carried out by unqualified people and when the lights were switched on half the field was unlit and one of the goalkeepers was bathed in so much light that he could not see the ball. Not very funny for the teams battling for points, or for the spectators.

Once an installation is handed over to a customer the responsibility for maintaining it is his, whether it be a football floodlighting job or a shop. More firms are now offering maintenance services but we feel there is still a lot to do to educate the customer in this important matter. A lot of skill goes into the design of a lighting installation; it is a pity to see this skill wasted through poor maintenance.



This complex but symmetrical assembly of nickel and brass rods and tubes, tipped by 192 six-volt lamps, hangs above the lobby of New York's Barbizon-Plaza hotel, where it rotates at 1/6 or 1/2 r.p.m. Designed by Richard Kelly and made by Edison Price Inc., it is 12 ft. in diameter and is constructed without flex. The current (it consumes 40 amp.) is conducted via the rods and tubes. (Photo: Dave Royter.)

View along pier, or "finger", towards main terminal building. Batteries of projectors floodlight the apron.

New terminal building at

GATWICK AIRPORT

Architects, F. R. S. Yorke, E. Rosenberg and C. S. Mardall. Associate in charge, Randall Evans, A.R.I.B.A. Architect in charge of project (including control tower and ancillary buildings), David Allford, B.A. (Arch.) (Sheffield), A.R.I.B.A. Assistant architect for terminal building, Brian Henderson, D.A. (Arch.), (Edin.), A.R.I.B.A. Site architect, Leon Morton. Consulting engineers, Frederick S. Snow and Partners. General contractor, Turriff Construction Corporation Ltd.; electrical contractor, T. Clarke and Co. Ltd.

AMONG aerodromes serving the London area Gatwick is unique in that it can be reached directly by road and rail. The main London-Brighton road actually passes through the new building, with ramps leading up to the entrance at concourse level, while Gatwick Airport station, on British Railways' Brighton line, adjoins the terminal building.

The development of Gatwick is intended primarily to relieve the growing load on London Airport by handling Channel Islands traffic and the flights of charter companies. It will serve also as a "relief" aerodrome when bad weather prevents landings at London or Northolt. Later, the terminal buildings may be extended to handle all European passenger services.

The new building consists of three parts: the main passenger-handling building—a rectangle, 360 ft. by 135 ft. in area; an operations block at the west end of the main building; and a pier or "finger" extending nearly 1,000 ft. further west across the apron. This pier—a feature of most American airports—eliminates the need for airfield buses to transport passengers from the terminal building to the aircraft. Instead, stairs lead directly down from the pier to the waiting planes alongside, there being parking space for 11 aircraft. The flat roof of the pier serves as an observation platform for visitors, and for friends and relatives of travellers.

A feature of the planning is the so-called Orly system of customs control, whereby baggage is collected from passengers and "customed" on arrival by road or rail, while the passengers themselves remain outside customs control until they are called forward to join their aircraft. This arrangement has the advantage that, during the time they are waiting, passengers are free to avail themselves of all the amenities of the terminal building—together with friends or relatives seeing them off.

At its present stage of development the building can handle 480 people an hour—240 in either direction. It includes, at concourse level, the processing desks and airline offices; the customs hall, search room and waiting area; the immigration hall; the airside lounge where passengers await immediately prior to take-off; a left-luggage office; railway booking office; bank; post office; several shops and enquiry bureaux; and, of course, the main hall, which extends the full height of this floor and the floor above—some 28 ft.

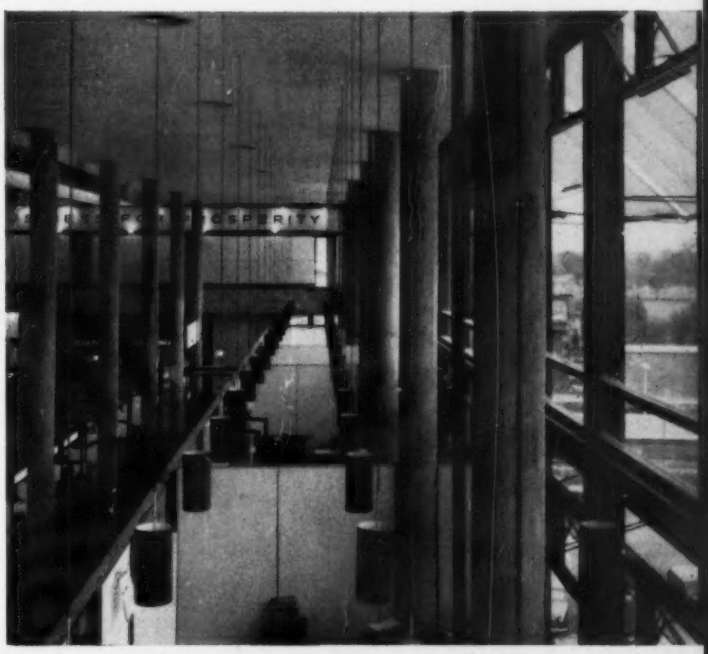
On the ground floor—i.e. at road level, below the

concourse—there is the baggage-handling area, mail room, power room and Plenum-plant chamber, various stores and a rest room, while on the upper floor—reached by a broad staircase from the main hall (though there are lifts as well)—there is a restaurant, with adjacent bar and lounge; additional offices; and, overlooking the concourse, an additional lounge, bar and buffet.

A mezzanine floor, at the west end of the building—between ground floor and concourse levels—includes the customs waiting room, where passengers from abroad gather before customs examination and immigration control.

Construction

The building is constructed of reinforced concrete on a 20-ft. grid, though the grid is interrupted over the main Brighton road and the site perimeter road, where massive prestressed concrete beams span, respectively, 69 and 60



Opposite page (top) view of concourse from top of stairs leading to first-floor buffet, restaurant and offices. Facing the camera is the railway information bureau and the exit to the railway station; on the right are the weigh-in counters. The close-up view at the foot of the page shows the construction of the continuous lighting "beams" which light the concourse area. The troughs are of glass fibre; the louvres of Georgian wired glass.

ft., while in the concourse area the 80-ft. width is spanned by 7-ft.-deep steel trusses. The large circular columns have been left with the rough texture produced by the timber shuttering—a controversial decision—thereby providing a strong textural contrast to the smooth "mechanical" surfaces of other internal (and external) finishes.

External cladding is of glass curtain-walling in units the full height of the building (above ground floor level), with mullions at 10-ft. centres of 8-in. x 5-in. r.s.j's and timber sub-framing. The r.s.j's project from the external face of the walling; are painted black; and provide a strong vertical element which, it has been suggested,

Top right, view of ground-floor airline offices as seen from balcony lounge. The cylindrical green-glass lighting fittings are suspended from the 27-ft. high concourse ceiling, level with the tops of the partitions dividing the offices. Right, west end of concourse, showing (through glazed partition wall behind kiosks) surface mounted "luminous beams" in customs hall and lighting by rows of ceiling-mounted prismatic-glass reflectors in balcony café.

Top, main restaurant, lit by glass-covered downlights recessed into false ceiling and by green-glass cylindrical shades housing tungsten lamps suspended low over the tables. Above, bar counter of balcony café, with green-glass fittings—suspended in foreground and surface-mounted to canopy over licensed bar.

implies incorrectly that this steelwork is the structural frame of the building.

There are top-hung steel-framed opening lights, while adjustable external sunblinds, bright-orange in colour, are fitted in two tiers to the south façade.

Internal finishes

The concourse floor is of large terrazzo slabs with a course aggregate of green Genoa marble; other floors are of vinyl tiles, with Wilton carpet in the restaurant and adjacent lounge/bar, and semi-glazed ceramic mosaic in the balcony lounge and buffet. The suspended ceiling in the concourse is of anodised aluminium sheeting, elsewhere most ceilings being of unpainted, 2-ft.-square sheets of asbestos boarding. Wall finishes include white, textured glazed tiles; coral-coloured mosaic; and ivory and dark-green p.v.c.-coated fabric. Demountable partitions between the offices have aluminium framing supporting panels of white-enamelled hardboard.

Lighting

In general, in accordance with the current trend among some architects, lighting fittings as such have been avoided, and with one notable exception most of the "fittings" have been made specially from simple components such as standard prismatic reflectors.

The concourse is lit mainly from three continuous lighting "beams" comprising rows of fluorescent lamps in semi-circular troughs of glass fibre set in the suspended ceiling of anodised-aluminium sheeting. Access for maintenance is from cat-walks above, while the troughs are fitted with transverse louvres of Georgian wired glass. In the airline offices along the south side of the concourse lighting is from rows of tungsten fittings suspended from the 27-ft. ceiling to approximately the level of the partitions dividing these offices. The fittings have cylindrical shades of green glass and are used also in the restaurant and other public areas on the first floor.

A number of internally-illuminated signs, such as those at the weigh-in desks, together with downlights recessed into the canopies over the counters of kiosks and enquiry desks, add sparkle to the concourse lighting.

In the balcony lounge and buffet overlooking the concourse rows of simple prismatic-glass reflectors are fixed directly to the ceiling. Extra light over the counter comes from a row of the green-glass fittings—suspended over the buffet area, ceiling-mounted over the bar—while glass-covered downlights recessed into a lowered ceiling light the displays at the rear of the bar.

Prismatic-glass reflectors are found again in the lounge leading to the restaurant, where they are inverted and mounted on metal brackets to form wall-lights. Additional light in this area comes from two of the green-glass cylinders, flex suspended very low over the occasional tables from ceiling-mounted track which allows the positions of the shades to be changed. The corridor through this lounge and through the adjacent bar is lit by a row of prismatic reflectors fixed directly to the ceiling, while the bar itself is lit by a row of small downlights recessed into the suspended canopy.

In the restaurant the main lighting is from larger, glass-covered downlights recessed into the false ceiling,

Left, corridor leading from airside lounge to concourse, lit by continuous rows of naked fluorescent lamps, suspended at the neatly-covered joints. Starting gear is concealed above the false ceiling. Right, foyer/lounge adjacent to first-floor restaurant. Standard prismatic-glass reflectors mounted on metal brackets serve as wall-lights, while two green-glass pendant fittings hang low over the occasional tables from an adjustable suspension system.

with decorative lighting provided from rows of the green-glass shades suspended several feet below ceiling level—some by means of flex sliding in ceiling-mounted track, as used in the lounge.

The architects are said to be particularly pleased with the simple lighting of the corridor leading from the air-side lounge to the concourse, which comprises simply two continuous rows of naked fluorescent lamps, with thin suspension tubes at each neatly-covered joint. Control gear is concealed above the suspended ceiling.

Lighting in the customs hall, where a high intensity is called for, comes from fluorescent lamps in five surface-mounted "luminous beams", the ceiling height being approximately 14 ft.

Posters and advertisements forming a frieze along the north wall of the concourse are lit by internally-silvered swivel spotlights fixed to the ceiling; extra light where required throughout the building is provided by various types of recessed downlight; and in the British Railways enquiry office adjacent to the exit to the railway station several closely-spaced rows of barrel-shaped opal-glass pendants are suspended from the ceiling.

Photographs on page 321, 323 (top), 324 (bottom) and 325 (bottom) by courtesy of the *Architect and Building News*. Lighting fittings supplied by: Hailwood and Ackroyd Ltd., Holophane Ltd., G.E.C. Ltd., A.E.I. Lamp and Lighting Co. Ltd., Crompton Parkinson Ltd., Benjamin Electric Ltd., Osler & Faraday Ltd., S.L.R. Electric Ltd., Revo Electric Co. Ltd., Walsall Conduits Ltd., Falk Stadelmann & Co. Ltd., Atlas Lighting Ltd., Merchant Adventurers Ltd., Troughton & Young (Lighting) Ltd.

Corporation Street façade, with picture window to restaurant above the entrance.

The Belgrade Theatre, Coventry

City architect and planning officer, Arthur Ling, B.A., F.R.I.B.A., M.T.P.I. Principal architect, Douglas Beaton, A.R.I.B.A. Group architect, Kenneth King, A.R.I.B.A. Main contractor, George Wimpey and Co. Ltd.; electrical installation, Lee Beesley and Co. Ltd.; lighting fittings, G.E.C. Ltd., Bernard Schottlander, Lumenated Ceilings Ltd.; neon sign, Ward and Co.; switchgear, G.E.C. Ltd.; stage lighting, Strand Electric and Engineering Co. Ltd.

ONE of the few theatres built in Britain since the war, the Belgrade Theatre, Coventry, is architecturally the most important. It is, moreover, unique in that it is the first civic theatre designed and built by a local authority. Opened by H.R.H. the Duchess of Kent, it is named after the City of Belgrade, with which Coventry had war-time links, and some £60,000 worth of Yugoslavian beech—a gift from the people of Belgrade—has been used in the internal finishing of the building.

The theatre seats 910—462 in the stalls, 371 in the circle and the remainder in the 16 boxes. In addition, there are extensive foyers on ground and first floors, a coffee bar on the ground floor and a restaurant and a bar on the first floor. There are two entrances—one in Corporation Street and one facing a new square, which is to be laid out with trees, grass and a small pool. The foyers and bars will overlook this square and the ground floor foyer will open on to a terrace alongside it.

The ground floor of the Corporation Street façade is occupied by a row of shops, while the upper three floors comprise 21 one-room flats, several of which are furnished and reserved for the use of members of visiting theatrical companies. A projection from this façade at first-floor level expresses the presence of the theatre. It consists of the picture window to the first-floor restaurant, the windows to the administrative offices, the name sign "BELGRADE", and a carved panel based on a 17th century engraving symbolising the City of Belgrade.

At the rear of the theatre is a park for 112 cars, while additional car-parking space is to be provided nearby.

The auditorium and stage are, in general, of conventional design. Boxes are arranged in two tiers on either side of the auditorium and at the rear of the stalls, and there is a balcony, divided into a circle and a dress circle, with entrances from either side. The orchestra pit can be covered over to provide a fore-stage and the stage is designed to give a visual link with the boxes on either side.

The aim has been to create a close relationship between the actor and his audience, and it will be possible for actors to make entrances and exits from the boxes

immediately adjoining the stage. The stage is equipped with 25 sets of single-purchase counterweights and the rear wall forms a permanent cyclorama. A workshop and paint room adjoin the stage, the latter being placed to act as a sound insulator between the stage and the workshop. A basement below the stage provides access for the orchestra and there are eight removable traps in the stage floor.

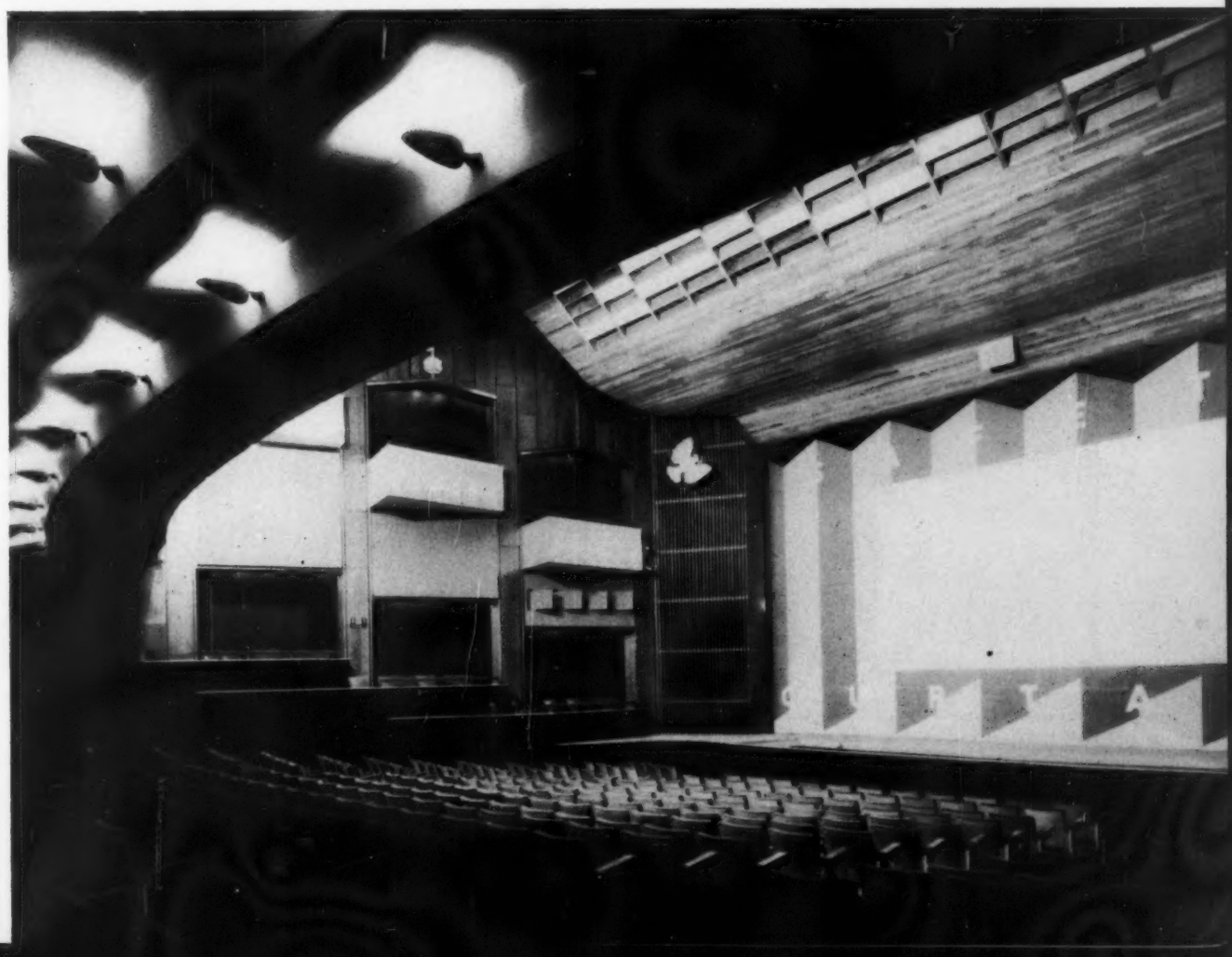
Backstage dressing rooms have been provided for a cast of about 34 and there is a wardrobe, bathroom and lavatories, stage manager's office, electricians' workshop and a prop room.

The theatre has been wired to take the equipment necessary for television broadcasts and, apart from the usual floods, spots and magazines on stage, front of house spolights are situated in the auditorium above the sound reflectors and on the side walls, between the upper and lower side boxes.

The theatre has an automatic oil-fired central heating and ventilation plant. Thermostatically-controlled recirculating heaters are built into the fabric of the building and a Plenum warm-air system for the auditorium ensures a sufficient number of air changes.

The gift of Yugoslavian beech mentioned above has been used for the sound reflectors over the proscenium opening, on the ceiling of the restaurant and above the first-floor foyer bar. The side walls of the auditorium are

Below, general view of auditorium, with theatre emblem—a dove—on proscenium arch, below the sound reflector of Yugoslavian beech. Note indirect lighting of rear stalls from spun-metal fittings attached to the stepped balcony soffit. Above, close-up of side boxes showing perforated cylindrical lighting fittings fixed to fronts of upper boxes.



First-floor foyer, looking towards restaurant, with view through staircase well into ground-floor foyer. The spiral-form chandelier of low-wattage lamps was designed by Bernard Schottlander, M.S.I.A.

panelled with plywood veneered in makore, while, to act as a sound absorbent at the rear of the circle and between the upper and lower tiers of boxes, there are panels covered in a woollen-faced Swiss fabric. The tip-up seating is upholstered with latex foam and covered in scarlet mohair plush. The tiered floors below the seats in the stalls and in the circle are covered with cork tiles, while the gangways are covered with a blue-black carpet.

An attempt has been made to give an added sense of space to the foyers by having openings in the first floor through which the lower floor can be seen. Between the first-floor foyer and restaurant one of the walls is set back and faced with a large mirror, while the restaurant is separated from the foyer only by floor-to-ceiling curtains. The rear walls of both foyers are faced with mosaic murals by Martin Froy.

The Building Research Station advised on the acoustic treatment of the auditorium—e.g. on the type of wall panelling, the positions of the sound reflectors and the profile of the balcony soffit—and Bernard Schottlander, M.S.I.A., was consultant for lighting fittings and signs.

The theatre emblem—a dove—appears in sculptured form on the proscenium arch; as a motif for the pattern of curtains in the cloakroom area; and, at eye level, is engraved into the glass of the entrance doors to prevent their being overlooked. The cost of the theatre was just over £200,000, the furnishings and equipment costing an estimated additional £16,000.

Lighting

A glass wall to the façade facing the new square gives plenty of daylight to the foyers during matinees and summer evening performances. Glazed with $\frac{3}{8}$ in. polished plate glass, it contains no opening lights, ventilation being provided by adjustable slotted aluminium louvres. The first-floor restaurant, too, has a large picture window of $\frac{3}{8}$ in. plate glass.

Single-pitch roof lights are used over the kitchen and the dressing rooms, the former having centre-pivoted opening lights on one long side, the latter having fixed ventilation louvres in the gable ends. Over the main fly-tower a haystack lantern is provided. The glazed sides are at an angle to the vertical so that opening lights in the long sides will open under gravity if the fusible links melt. Otherwise, these lights can be opened by winding gear at stage level.

The entrance hall is lit by a luminous ceiling of corru-

The restaurant, looking towards the picture window facing Corporation Street. Opal-glass shades in groups of three are linked by a construction of brass rod. They form 12-light fittings which are suspended from the ceiling of Yugoslavian beech.

gated plastic panels, with the aluminium framing of extra width in one direction only to add interest to the appearance. The 40-watt warm-white fluorescent lamps above are arranged to create a pattern of light rather than completely even illumination. The marble-topped counter of the cloakroom has a trough above, with hardwood sides and a soffit of perforated metal supporting a sheet of opal glass which diffuses the light from the concealed lamps.

Ground and first floor foyers are lit by downlights fully recessed into the ceiling and fitted with concentric louvres, while in each of the two open staircase wells hang two " chandeliers " of polished brass, comprising a spiral of low-wattage lamps.

Auditorium lighting comes from several sources, the main component being from lamps concealed in glass-covered recesses in the beech sound reflectors which form the ceiling over the stalls. Other recesses in these reflectors house stage spotlights. Additional light comes from cylindrical fittings of perforated brass fixed to the fronts of the upper boxes and the front of the balcony, and from a row of brandy-bowl opal-glass fittings fixed to the pillars between the boxes at the rear.

The back of the stalls is lit indirectly by rows of lamps in spun-metal reflectors fixed to the vertical surfaces of the stepped soffit of the balcony, while the balcony itself is lit by glass-covered downlights recessed into the ceiling.

The restaurant and bar on the first floor are both lit by tungsten fittings with opal-glass shades. In the bar, single shades are suspended from the steeply-sloping ceiling by simple brass brackets. In the restaurant several composite fittings are used. They comprise four groups, each of three shades, linked together by a construction of brass rods and suspended from the ceiling at seven points. The area of the restaurant immediately adjacent to the counter, as well as the counter itself, is lit by downlights, while concealed strip lighting is used to light the displays at the rear.

Stage lighting comprises spot bars, floods and magazines on stage, and front-of-house spots and perches. It is remotely controlled from a soundproof box at the back of the stalls, used also by the stage director, which gives the electrician a full view of the stage and reduces his reliance on cues for lighting changes. The lighting is controlled from a 60-way panel with duplicate controls and change-over for pre-setting via electric magnetically-actuated wire-wound dimmers. The dimmers themselves are housed in a room at the back of the stage. The control room and the dressing rooms are all equipped with loudspeakers relaying sound picked up by microphones on the stage, thus keeping every member of the company in contact with the progress of the play and eliminating the need for call-boys.

The electrical installation comprises 3-phase a.c. mains to a main switch panel in the dimmer room. A secondary board controls all front-of-house lighting, except that of the auditorium. V.i.r. cable is used—250-volt and 660-volt grade—in heavy-gauge screwed conduit and pressed-steel trunking. Main and secondary panels are connected by p.i.l.c.s.w.a. cable and switches in public areas are of a special safety pattern with flush aluminium plates.

Entrance hall, looking towards ground-floor foyer, with cloakroom on left. The luminous ceiling has extra-wide framing members in one direction to form a decorative pattern.

Air-Pressurised Electrical System for Hazardous Atmospheres

The principle of pressurisation, by air or an inert gas, of an electrical installation run in conduit has frequently been suggested for use in hazardous areas (such as hydrogen) for which no flameproof equipment is approved. Pressurisation by itself, however, is open to the objection that the installation would be unsafe if pressure were lost for any reason. Similarly, the use of a pressure-sensitive switch in the mains fed circuit is not acceptable, since in breaking such a circuit the switch itself could be a source of danger.

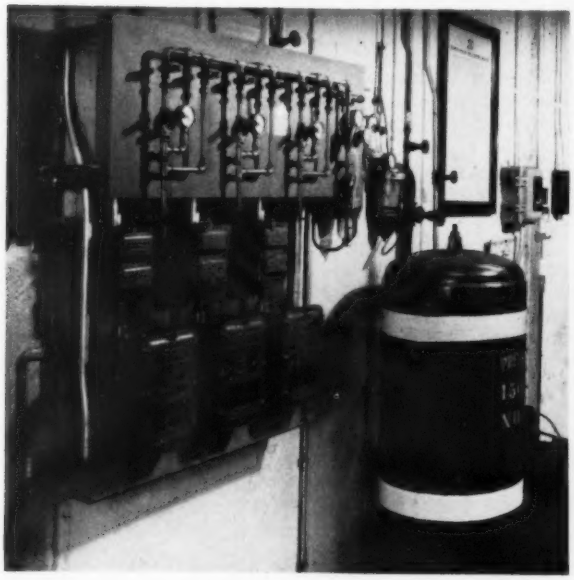


Fig. 1. (Above) A typical installation of the GEC air-pressurised system incorporating three control units of the type designed for use in a "safe" area adjacent to the hydrogen area.

In the GEC Air-Pressurised Electrical System for hydrogen atmospheres use is made of an intrinsically safe control circuit in which are included one or more pressure switches; this control circuit, being intrinsically safe in hydrogen, can remain energised whether air pressure is present or not. This safe circuit in turn operates, by a relay system, a contactor housed in a control unit outside the hydrogen area.

Over the past few years a number of such installations have been supplied by the GEC for situations where a hydrogen explosive hazard can arise, but these have been subect to individual approval by the Factory Inspectorate. However, the Factory Inspectorate has recently issued a general approval of the system (Cert. No. 203/IS3050), which covers the use of the system where there may be risk from any of the vapours or gases in the Pentane, Ethylene and Hydrogen classes. The certificate also covers certain GEC industrial lighting fittings.

Any mains-operated electrical equipment which is suitable for pressurisation at ¼ lb. per sq. in. or more can be operated in the above atmospheres by means of the pressurised system. This includes motors, for totally-enclosed machines can be adapted readily by suitable gaskets for running under pressure.

The essential element in the pressurised system is the intrinsically safe control circuit, which opens the mains contactor if there is a loss of pressure in the conduit or in any of the apparatus connected to it. This is a low-voltage circuit fed from an intrinsically safe transformer, and is carried inside the same conduit as contains the mains cables. The circuit energises a relay in the operating coil circuit of the mains contactor, and is completed through the contacts of pressure switches included in the conduit run at intervals of 15-20 ft. Thus, the opening of the contacts of any pressure switch due to a loss of pressure in the

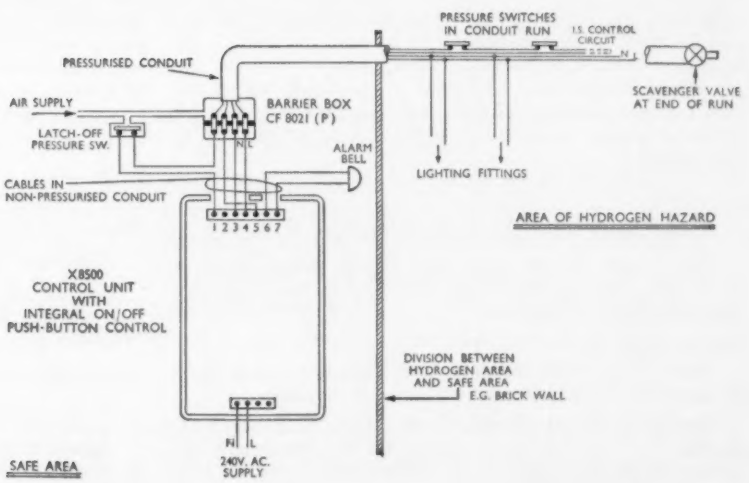

PRESSURE SWITCHES IN CONDUIT RUN
I.S. CONTROL CIRCUIT
PRESSURISED CONDUIT
SCAVENGER VALVE AT END OF RUN
AIR SUPPLY
BARRIER BOX CF 8021 (P)
LATCH-OFF PRESSURE SW.
ALARM BELL
LIGHTING FITTINGS
CABLES IN NON-PRESSURISED CONDUIT
AREA OF HYDROGEN HAZARD
1 2 3 4 5 6 7
X8500 CONTROL UNIT WITH INTEGRAL ON/OFF PUSH-BUTTON CONTROL
DIVISION BETWEEN HYDROGEN AREA AND SAFE AREA E.G. BRICK WALL
N L
240V. AC. SUPPLY
SAFE AREA

Fig. 2. Diagrammatic layout of an installation with non-flameproof control unit in "safe" area.

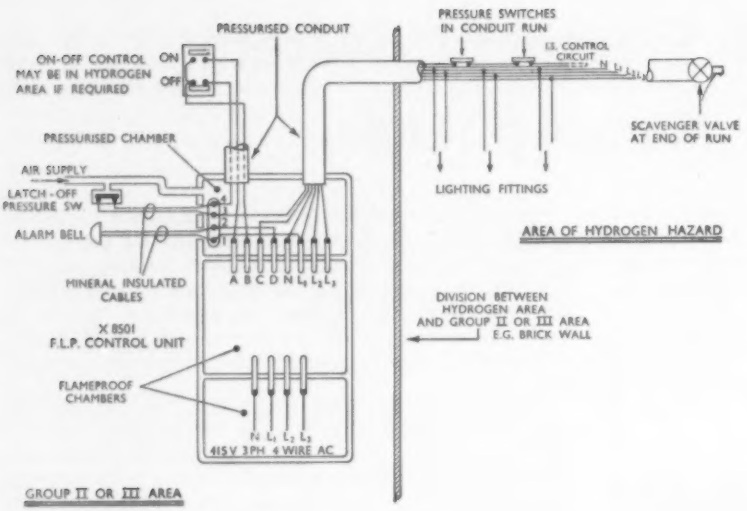

PRESSURISED CONDUIT
PRESSURE SWITCHES IN CONDUIT RUN
ON-OFF CONTROL MAY BE IN HYDROGEN AREA IF REQUIRED
ON
OFF
I.S. CONTROL CIRCUIT
SCAVENGER VALVE AT END OF RUN
PRESSURISED CHAMBER
AIR SUPPLY
LATCH-OFF PRESSURE SW
LIGHTING FITTINGS
AREA OF HYDROGEN HAZARD
ALARM BELL
MINERAL INSULATED CABLES
A B C D N L1 L2 L3
DIVISION BETWEEN HYDROGEN AREA AND GROUP II OR III AREA E.G. BRICK WALL
X 8501 F.L.P. CONTROL UNIT
FLAMEPROOF CHAMBERS
N L1 L2 L3
415 V 3PH 4 WIRE AC
GROUP II OR III AREA

Fig. 3. Diagrammatic layout of installation with flameproof control unit in Group II and III area.

system results in the tripping of the mains contactor, and it is also impossible to energise the operating coil of the contactor to switch on the mains supply unless the system is correctly pressurised. On the other hand, the control circuit, being intrinsically safe, can remain energised irrespective of whether pressure is present or not throughout the installation.

A latched pressure switch may be inserted adjacent to each main control unit. This latches out on a fall of pressure, and its enclosure is supplied with a padlock so that the switch can be reset only by a responsible person whose duty it is to ensure that the whole system is adequately purged before the electrical supply is restored. An external alarm bell can be connected to give a warning if for any reason the mains contactor remains closed after pressure has been lost.

The intrinsically safe transformer, mains contactor and contactor control relay are housed in a control unit which is supplied either in a form suitable for installation in a "safe" area adjacent to a hydrogen area, or in certified flameproof form. When the "safe" area type is installed, the unit is coupled directly to a barrier box which separates the non-pressurised from the pressurised part of the installation and has provision for connection of the air supply on the outgoing side. The flameproof unit, which can be installed in a Group II or III area adjacent to the hydrogen area, incorporates its own integral barrier and air supply connections. Provision is also made within this unit for incorporating a step-down transformer to provide a 24-volt supply where the equipment is to be operated at this voltage.

The control unit for "safe" areas is fitted with indicator lamps showing when the mains supply is on and the system is safely pressurised. Pushbuttons for controlling the mains contactor (subject to the pressure switches being closed) are mounted on the cover. When the flameproof unit is installed, the system is controlled from remote pushbutton stations.

Pushbutton on/off switches are available for the local control of lighting inside the hydrogen areas. Lighting installations would normally be divided between at least two control units so that in the event of pressure being lost in one system, the lights connected to the other would continue to operate. Standard types of motor starters can be mounted in safe areas, or flameproof starters in Group II or Group III areas adjacent to hydrogen areas, and control can be arranged from within the hydrogen areas.

The equipment supplied by the GEC includes complete air control panels, but the air supply itself is taken from the works compressed air lines through a reducing valve or, for lower pressures (below about ½ lb. per sq. in.) from a blower.

Installations of this pressurised system are operating in the steel, chemical, oil, edible fats and other industries, controlling both lighting and motors. Since no flameproof equipment has been approved for hydrogen areas, this pressurised system is the only form of complete installation approved for such areas. The pressurised system may, of course, be used as a substitute for standard flameproof equipment in Group II and III areas, but for lighting only may prove more expensive than ordinary flameproof gear.

City and Guilds Examination Results

The results of the City and Guilds examinations in illuminating engineering which were held in May have just been announced as follows:—

INTERMEDIATE GRADE

First Class: T. J. Brooke, C. E. Goddard, B. A. Hall, B. Kemp, R. F. Stimson, J. Whittaker, A. Wilson.

Second Class: B. Adam, G. R. Allen, R. Baker, S. S. Booth, T. J. Brough, J. C. Budd, D. W. Fleming, R. E. Green, M. H. Harvey, P. C. A. Mountford, I. Pindor, J. S. Leishman, D. I. Murdoch.

FINAL GRADE (PAPERS 1 & 2)

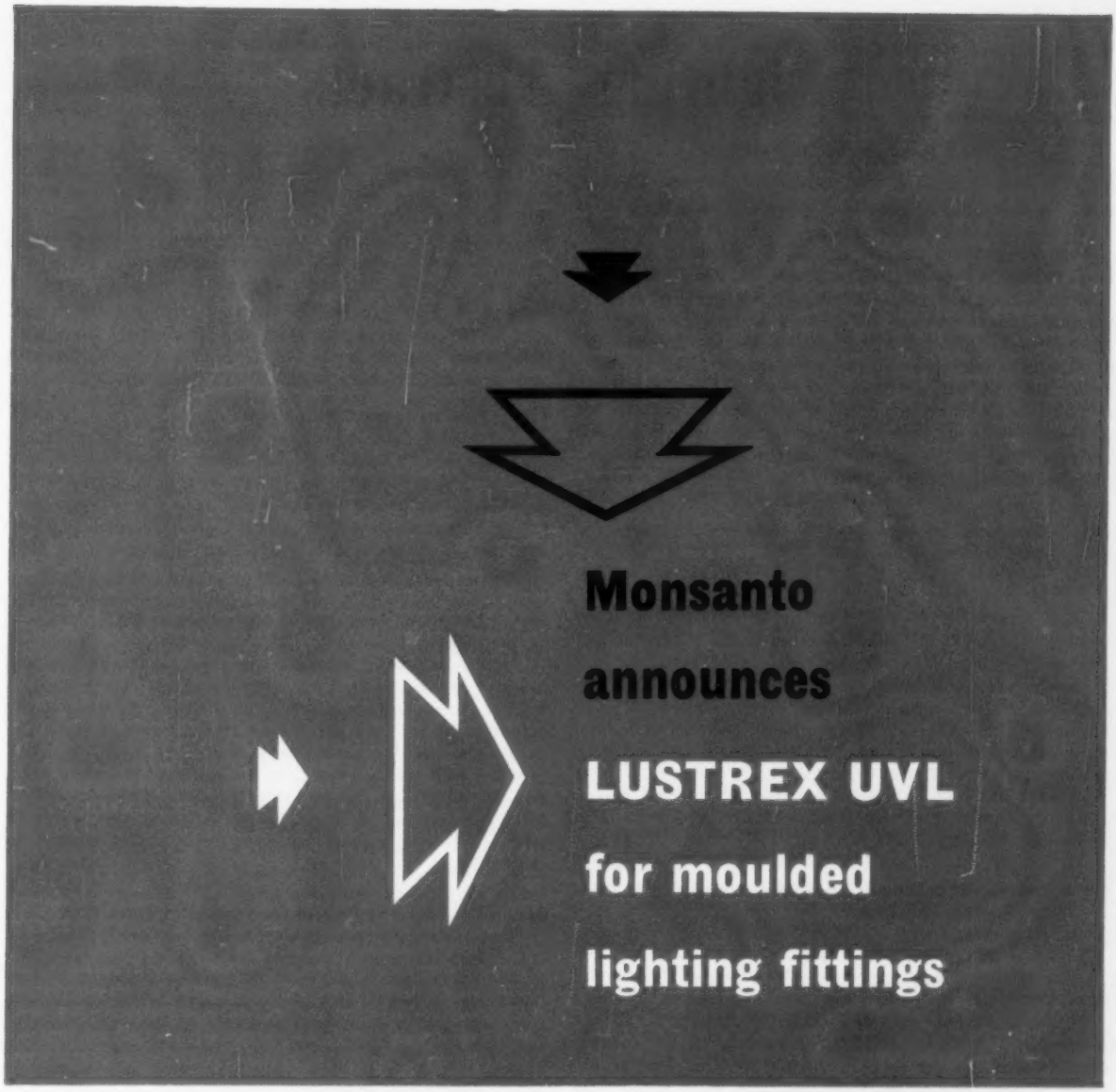
First Class: J. B. Davey, B. Ruston, W. Yeadon.

Second Class: J. E. Baker, J. R. Barker, M. Boardman, J. L. Cooper, F. R. Grant, W. Smyth, W. A. Varney, A. J. Walder.

FINAL GRADE (PAPERS 1 & 3)

First Class: J. E. Baker, J. L. Cooper, A. Whitehead.

Second Class: R. E. Brown, A. V. Chapman, B. Ruston, W. Smyth, G. A. Spenser, Miss E. A. P. Tingle, A. J. Walder, M. J. Wells, P. A. Worthington, W. Yeadon.



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Lighting Abstracts

OPTICS AND PHOTOMETRY

535.24

604. A photographic method of brightness recording.

C. and E. MARSH, *Illum. Engng*, **53**, 355-357 (*June*, 1958).

To obviate the lengthy process of scanning a photographic negative in order to produce equal brightness contours, a technique has been developed whereby each contour is produced by increasing the contrast of the negative until a sharp boundary without gradation is formed between the black and white areas of the photograph. The required contour is then located at this boundary. The contrast of the film is increased by printing and reprinting from the original negative on very high contrast film. The brightness corresponding to the contour is determined from the time of exposure during this reprinting process. P. P.

535.24

605. Automatic processing of photometric test data for street lighting luminaries.

G. A. HORTON and P. A. ZAPHYR, *Illum. Engng*, **53**, 341-349 (*June*, 1958).

The processing of the photometric data for a street lighting luminaire to obtain iso-footcandle diagrams and utilisation efficiency curves can now be conveniently performed by electronic computers, of which the IBM type 704 high-speed, internally-programmed digital computer is an example. The stages in programming the test data and operating the computer are described, particular attention being given to the way in which iso-footcandle contours are calculated and printed. A future development will be the automatic recording of the data, so as to simplify the programming procedure. P. P.

612.843.36

606. Luminosity functions for various field sizes and levels of retinal illumination.

R. E. BEDFORD and G. W. WYSZECKI, *Journ. Opt. Soc. Am*, **48**, 406-411 (*June*, 1958).

The relative luminosity factor ($V\lambda$) has been measured for four normal trichromats for three field sizes (1°, 12′ and 1·5′) and at various values of retinal illumination. As the illumination decreases there is a decrease in the spectral sensitivity of the eye to blue relative to red. The dependence of the spectral sensitivity on field sizes is not pronounced for the experimental conditions used. The differences found between the luminosity functions of the observers are several times as great as those obtained on repeated curves by any one observer and the use of an average function may give very misleading results. A comparison is made with the values obtained by previous workers. J. W. T. W.

612.843.6

607. The application of visibility meters to the assessment of adequacy in mine lighting.

A. ROBERTS and D. F. GIBSON, *Colliery Guardian*, **196**, 217-223 (*Feb.*, 1958).

The application of meters to the study of visual tasks in coal mines is examined with particular reference to the Luckiesh-Moss and Cottrell instruments. In addition, the authors describe a new mining-type meter incorporating a miner's cap lamp headpiece to determine contrast sensitivity, which has been designed and calibrated in terms of the background brightness of the visual field and the reflection factor of the object to be seen. In comparing the relative validity of the Luckiesh-Moss index and contrast sensitivity as a measure of visibility, "Contrast sensitivity" is regarded as being a better index of visibility than the readings of the L-M meter since it will be less affected by errors due to eye adaptation phenomena. A report of the discussion on this paper appears in Vol. 197, page 56 (July, 1958) of the same journal. D. A. S.

LAMPS AND FITTINGS

608. New polyester-filled ballasts. 621.329

J. FILLEUX, *Lux*, **26**, 14 (*Jan.-Mar.*, 1958). *In French.*

Describes ballasts for fluorescent lamps which are "potted" in polyester resin for which it is claimed that its superior filling properties and better heat transmission permit smaller ballasts and its rigidity gives completely silent operation. A better life under high temperature is also claimed. J. M. W.

621.327.9

609. The xenon lamp and its application to the theatre.

Lux, **26**, 16 (*Jan.-Mar.*, 1958). *In French.*

Describes theatre spotlight containing a 160-watt xenon lamp, ellipsoidal collecting mirror and projection lens, a final directing mirror, and a three-filter chromoselector arrangement whereby the colour of the beam of light can be continuously changed during use. The lamp can only be used with its axis vertical; the spotlight therefore consists of a vertical cabinet with the final directing mirror at the top, controlled by a joystick. Intensity can be varied down to 10 per cent of maximum by electrical control of the lamp. J. M. W.

621.329

610. Two service rooms in the Stockholm Town Hall.

E. GLEMME, *Byggmästaren*, **36**, 222-225 (*A* 10, 1957). *In Swedish.*

A description is included of original lighting fittings which are suspended over the conference tables, in the one room employing incandescent lamps, in the other fluorescent tubes. R. G. H.

611. Light sensitive glass. 621.329

G. GUNTHER, *Ljuskultur*, **30**, 55-59 (*April-June*, 1958). *In Swedish.*

Many forms of glass which contain small amounts of metallic elements are light sensitive. Modern light sensitive glass consists generally of a hard basic glass of a silica type with an overlay of alkaline oxide, incorporating light sensitive metals, such as gold, silver or copper, and thermal reducing agents and optical sensitisers. The operation and uses of such light sensitive glasses are discussed. R. G. H.

621.327.4

612. Development of de luxe fluorescent-mercury lamps for commercial and specialised applications.

W. S. TILL, *Illum. Engng*, **53**, 224-231 (*May*, 1958).

Attempts to correct the colour rendering of mercury discharge lamps have included the use of red-tinted filters and reflectors, the addition of tungsten lighting and the incorporation of a fluorescent coating on the lamp bulb. The most successful of recent solutions appears to be a colloidal metallic coating which is fired to the bulb of a magnesium

fluorogermanate fluorescent-mercury lamp, giving the bulb a "purple lustre". A range of these de luxe lamps has been developed experimentally and applications of the lamps in offices and commercial premises are discussed. P. P.
628.971.6

613. Application experience with mercury vapour lamps in street lighting service.

J. W. YOUNG, *Illum. Engng*, **53**, 253-261 (*May*, 1958).

Current American street lighting practice includes the use of approximately 600,000 mercury vapour lamps ranging in size from 100 to 1,000 watts, by far the most popular being the 400-watt clear bulb lamp. The advantages of fluorescent-mercury lamps in terms of efficiency and colour rendering are appreciated, but these lamps are not yet widely adopted. Reliable starting at low temperature is one of the operating characteristics considered, and here it is found that for street lighting purposes reliable starting down to 0° F. can be achieved with economical ballast sizes provided the supply is from 240-volt mains. P. P.
535.24

614. Recommended light characteristics of polystyrene used in illumination.

Illum. Engng, **53**, 284-286 (*May*, 1958).

Prepared by the Light Control and Equipment Design Committee of the American IES jointly with other interested bodies, these recommendations define the test procedures to be adopted when determining the stability towards yellowing, refractive index, regular light transmission and reflectance of polystyrene compounds, either unmodified or modified to inhibit heat distortion and discoloration. The photometric tests are, in general, those recommended by the American Society for Testing Materials (ASTM), the tests not being specifically related to polystyrene. P. P.

615. HPMV lamp with a capacitive ballast. 621.327.534.2

K. H. BODENHAUSEN, *Lichttechnik*, **10**, 256-259 and 313-316 (*May and June*, 1958). *In German.*

The first part of this paper contains an account of the characteristics of HPMV lamp operation on different types of circuit. With a purely inductive ballast a p.f. correcting capacitor is normally put across the mains and this acts as a short-circuit for the high frequency impulse often used for street-lighting control. A purely resistive ballast is less efficient and a purely capacitive ballast is destructive of the lamp on account of the very high peak currents. The author favours the so-called "over-compensated" ballast, consisting of an inductive choke and a capacitor in series, and the characteristics of this circuit are described fully in the second part of the paper. Power-factor correction can be obtained by using a twin-lamp circuit. It is to be noted that Figs. 4 and 6, referring respectively to the over-compensated ballast and to the purely resistive ballast, have been interchanged in the paper as published. J. W. T. W.

LIGHTING

616. Lighting, a basis for design. 628.972

DEREK PHILLIPS, *Architectural Record*, **123**, 187-194 (*April*, 1958).

Skill in the use of new light sources lags far behind their introduction. Very high levels of illumination have become possible and are used but architects as a whole do not know how to use lighting as a contribution to their total designs. To achieve more expressive lighting the architect must state each lighting problem clearly to the lighting engineer, and adequate data on lighting equipment must be supplied to the architect to enable him to assess the brightness patterns which will be obtained with any particular piece of equipment in any situation. The article discusses the importance of lighting as a design factor and in particular the less tangible aspects of lighting which can make an installation satisfying. The use of artificial lighting to create a positive impression by night is also dealt with. Illustrations are given of installations which do more than provide lighting adequate for whatever task is to be performed.
G. C.
628.971.6

617. Estimating the cost of a roadway lighting system.

T. SUMMERS, JR., *Illum. Engng*, **53**, 269-277 (*May*, 1958).

The relative merits of series and parallel operation of street luminaires are considered, particularly with respect to the operating requirements for mercury discharge lighting. Detailed cost comparisons are made for filament, fluorescent and mercury (including colour-corrected mercury) lighting by installations typical of three types of street lighting. Uncorrected mercury is found to be the more economical, but a more expensive installation may be justified on the grounds of better colour rendering. P. P.

618. Approximations and the interflection method. 628.93

D. E. SPENCER, *Illum. Engng*, **53**, 243-249 (*May*, 1958).

Discrepancies between illumination predictions using the Moon/Spencer Interflection Method and measurements in model rooms can be attributed to approximations in the calculation technique, to the physical characteristics of the model rooms or to the experimental procedures employed. The errors introduced by replacing the complex integral equations by approximate exponential kernels have now been worked out for a room with ceiling lighting. The Interflection Method is found to underestimate the inter-reflected light by varying amounts, depending on room shape and surface reflectancies. Although corrections to the interflection values are offered, these corrections are balanced out if the rooms are furnished. P. P.
628.93

619. Calculation of utilisation coefficients for indoor luminaires by computers.

P. A. ZAPHYR and G. A. HORTON, *Illum. Engng*, **53**, 236-240 (*May*, 1958).

Increasing use is being made of digital computers for the analysis of test data met with in illuminating engineering. A particular application has been to the calculation of coefficients of utilisation, using the Jones/Neidhart Zonal Factor Interflectance Method. In programming the computer, 2428 data items need to be stored. A formula-translation technique is used to speed up the programming. A typical set of results is reproduced, corresponding to 200 different combinations of room index and surface reflectance, and taking half a minute to calculate. P. P.
628.92

620. Window protection devices—an experimental investigation.

G. V. PLEIJEL, *Byggmästaren*, **36**, 207-216 (No. B9, 1957). *In Swedish.*

A detailed comparison was made, under closely controlled conditions, of the heat insulating properties of different forms of window protection device, including venetian and pleated paper blinds, aluminium foil layers, and transparent honeycombs of cellulose acetate. A single-pane window with a translucent pleated blind behind (light transmission 18 per cent) gave an insulation almost as good as a double glazed window. The paper is of interest in giving data relevant to the determination of the relative costs of large windows and artificial lighting. R. G. H.

INSTALLATIONS

Three decorative installations

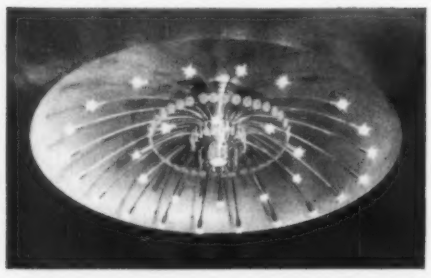
The Board Room of the Chartered Auctioneers and Estate Agents Institute in Manchester was built in 1852 to the design in the Italian Renaissance style by Thomas Worthington. Until recently it was lit by incandescent lamps to a very low level of illumination which did nothing to reveal the beauty of the room. In relighting this room (inspired incidentally by an exhibtion arranged by the Manchester Centre of the IES) use was made of a cornice which proved ideal for concealing fluorescent lamps and for giving a good spread of light across the ceiling. The lamps used are 8 ft. 125-watt warm white. The panels of the ceiling and cornice friezes are in Wedgwood blue ; the remainder of the ceiling is white with gold relief. The walls are cream and pale green with sandy beige panels. The lighting scheme was designed and installed by the North Western Electricity Board.

In the new Clothworkers' Company Hall at Mincing Lane (Architects : Whinney, Son & Austen Hall) effective use is made of chandeliers, specially designed and made by the GEC, on the reception landing at the head of the grand staircase, in the reception rooms and in the banqueting hall. On the landing and in the reception rooms the chandeliers silver with moulded glass decorations. In the banqueting hall the chandeliers consist each of six fittings giving direct

Board room of the Chartered Auctioneers and Estate Agents Institute, Manchester.

Grand staircase at the Clothworkers' Hall.

Decorative fittings in the new London theatre-restaurant 'The Talk of the Town'.



and indirect lighting.

Two specially designed chandeliers also form part of the GEC decorative lighting scheme in the new London theatre-incorporate 18 round bulb lamps and are finished in satin restaurant called "The Talk of the Town". Each is 10 ft. high and carries 200 so-called "sputnik" shaped bulbs giving a cascade of light. Other fittings, of which one is illustrated, use similar lamps.

Fanum House, Glasgow

The reception area in the new Glasgow headquarters of the Automobile Association is lit by a combination of fluorescent fittings and luminous panels all of which are recessed into a Burgess acoustic-heated ceiling. Six 4 ft. x 2 ft. AEI module fittings are used in the main area and four luminous ceiling panels light the desk. Accent lighting at the entrance is provided by spotlight fittings recessed into the canopy. The interior was designed by Wright & Kirkwood.

Reception area of Fanum House, Glasgow.

Luca Airport, Malta

The passenger handling building at Luca Airport, Malta (Architects: Norman, Dawbarn & Partners) is a long narrow building with luggage checking benches along one side. The main lighting is provided by two specially designed fluorescent pendant fittings, one 72 ft. long and the other 52 ft. long. Lighting over the luggage counters is provided by a combination unit which incorporates downward semi-recessed spotlights and fluorescent lamps giving some light up on to the ceiling. The fittings were supplied by Courtney, Pope (Electrical) Ltd.

Passenger handling building, Luca Airport, Malta.

Red Ensign Club

The Red Ensign Club is a residential club for officers and ratings of the Merchant Navy. A new extension (Architect: E. Brian O'Rorke) was recently opened. A large area of glass is used on the ground and first floors giving a welcoming blaze of light at night. Standard fluorescent fittings in the Falk, Stadelmann "Thames" range were used.

Exterior of the Red Ensign Club, London.

Strand Palace Hotel

In restyling the ladies' hairdressing salon at the Strand Palace Hotel an illuminated ceiling (437 sq. ft.) was designed by Crompton Parkinson Ltd. in conjunction with Holland & Hannen and Cubitts. The illumination level is 30 lm/ft^2. Ventilation is provided by ten outlets in the blank ceiling panels which lead to ducts above the false ceiling.

Ladies Hairdressing Salon, Strand Palace Hotel.

NEW PRODUCTS

Transistor-inverter unit.

The General Electric Co. Ltd. in conjunction with Vickers-Armstrongs (Aircraft) Ltd. has developed a transistor-oscillator inverter unit which, for the first time in this country, enables fluorescent lighting to be used in airliner cabins, operated at low voltage through static equipment from the aircraft's batteries. The first application in an aircraft of these units in conjunction with fluorescent lighting will be in the Vickers Vanguard turbo-prop airliners which are under construction for British European Airways and Trans Canada Airlines.

In the Vanguard, 4 ft. and 3 ft. fluorescent tubes are being used for the main cabin lighting. To secure the desired low surface brightness from the Perspex diffusing enclosures, the tubes will be operated at a reduced wattage. The transistor-inverter equipment for each fluorescent tube has been designed to operate over an input voltage range of 22-28 volts d.c.

The advantages of this development in its application to aircraft cabin lighting lie partly in increased passenger comfort resulting from the low brightness of fluorescent tubes, and partly in the greater economy and reduced maintenance resulting from the use of the transistor-oscillator inverter. High frequency rotary inverters in the past have been costly and have usually required fairly frequent servicing when in constant use. They have also taken up space and added considerable weight to the vehicle involved.

The recent introduction of transistors of adequate power handling capacity has opened up a new approach to the problem, owing to the inherent properties of the transistor. These include its small size and weight, the absence of moving or wearing parts, its indefinitely long life, mechanical robustness, and the high power conversion efficiency obtainable.

For use in aircraft, a very important feature is the weight of the GEC transistor-inverter unit has been designed down to a weight of only 1½ lb. In view of the very high ambient temperature in which the equipment must be capable of operating this represents a significant achievement, because transistors are very critical in the temperature rise which they can withstand safely.

A GEC transistor-inverter fluorescent lighting system is already being used experimentally in the Caledonian London-Glasgow express of the London Midland Region of British Railways. Seven first-class coaches of this train have been equipped with the system, operating on the 24-volt d.c. supply from the coach batteries which is converted by means of the inverter units to provide the requisite operating voltage at a high frequency.

8 ft. fluorescent fittings.

Three new AEI "instant start" 8-ft. 125-watt industrial fittings, all based on the same power pack have been added to the family of fluorescent fittings range introduced in 1953. They are a batten fitting, an open-ended reflector fitting and a closed-end reflector fitting. Each is available as a single or twin lamp fitting. All these new 8-ft. fittings are similar to their 5-ft. equivalents in the "family" range, having in common many standardised parts and based on one piece power packs.

Fluorescent corner fitting.

A new diffusing fluorescent fitting specially designed to fit into corners has been introduced by Atlas Lighting Ltd. Similar in appearance to the "Domino" series, the new fitting (the KCQ series) is rectangular and comprises a one-piece asymmetric diffuser of opal "Perspex," with matt black metalwork stove enamelled white internally. Conduit entry is provided in the rectangular metal end plates so that the units can be mounted end to end if desired. The light distribution can be varied by mounting the fitting horizontally or vertically.

Vapourproof fitting.

A.E.I. Lamp and Lighting Co. Ltd. have introduced a new 150/200-watt vapourproof tungsten wellglass fitting for use in oil refineries, chemical plant and similar situations. The fitting has a corrosion-resistant LM-6-M aluminium alloy canopy, tapped for top entry (1-inch electrical thread), and a heat resisting wellglass protected by a galvanised wire guard. There is a 14-inch diameter p.v.c. reflector available as an optional extra and the fitting can also be supplied with either a 45° angle entry or conventional side entry.

The wellglass is held in position by the galvanised wire guard by means of a screwed pad with brass wing screw fastening which exerts pressure on the wellglass and "Neoprene" sealing gasket. To re-lamp the fitting the pressure pad is released and the wire guard may then be lifted and rotated to free it from the top casting. The glass and guard is still retained in position by one lug and can be hinged to one side for re-lamping. The unit is supplied complete with lampholder to take 150- or 200-watt lamps with ES caps.

Miniature projector lamp.

Developed for and used exclusively in the new Super Aldisette small slide projector, the Class A1/176 500-watt miniature projector lamp has recently been added to the "Mazda" range of Class A1 projector lamps. Made by the A.E.I. Lamp and Lighting Co. Ltd., this lamp has an efficiency value of 24 lumens watt, and is available in voltages ranging from 150 to 250. Forced cooling is necessary so that no part of the wall of the bulb exceeds 400°C.

Colour-illuminated murals.

J. A. MacIntyre Ltd. (Craig's Court House, 25, Whitehall, London, S.W.1) have formed a new business, MacIntyre Displays, operating from the same address, to develop an improved method of illuminated display perfected by Mr. Marcel Ronay who specialises in carving in "Perspex" and for which application for Patent has been made.

Using transparent colourless "Perspex" acrylic sheet, light is diffused in such a manner that the engraved design on the sheet shows up in the colour desired whilst the background remains transparent. From a single sheet in one colour, and by superimposing other sheets which are diffused with different colours, a picture is created giving a three dimensional effect.

Erratum

In the September issue under the heading "Accessories for vapour-proof fittings" on page 314 the fitting concerned was incorrectly referred to as "flame-proof". We apologise for this error.

I.E.S. ACTIVITIES

Vice-Presidents and Regional Chairmen, 1958-59

VICE-PRESIDENTS

F. X. Algar

Mr. F. X. Algar, B.E., B.Sc., M.I.C.E.I., F.I.E.S., joined the Electricity Supply Board of Ireland in 1928, where he is responsible for the Board's lighting activities, including the lighting Bureau, and for street lighting throughout Eire excluding only the City of Dublin. He is hon. secretary of the Irish National Committee on Illumination and is on the Executive of the NIC.

N. Boydell

Mr. N. Boydell, M.I.E.E., A.M.I.Mech.E., has been in the Electricity Supply Industry for most of his career. Formerly Borough Electrical Engineer and Manager at Eastbourne, since nationalisation he has been area manager for East Sussex and South-West Kent and for the SE Board. He is a past-president of the APLE.

H. G. Campbell

Mr. H. G. Campbell, M.A., A.M.I.Mech.E., A.M.I.E.E., has been a member of the IES since 1939 and was elected a Fellow in 1948. He is managing director of the Benjamin Electric Ltd. He has previously served as vice-president and on various committees of the Society; he was chairman of the committees responsible for the last two summer meetings.

A. H. Olsen

Mr. A. H. Olsen, A.C.G.I., after training at the City and Guilds, took a college apprenticeship at Metropolitan-Vickers at Trafford Park. After service with REME during the war he started the firm of Courtney, Pope (Electrical) Ltd. of which he is now managing director and a director of the associated group of companies. He is a Fellow of the Society.

D. L. Tabraham

Mr. D. L. Tabraham, M.A., is Manager of the Lighting Fittings and Illuminating Engineering Departments of the GEC Ltd. He is a Fellow of the Society. He joined the GEC Research Laboratories in 1935 and later served in the IE Dept. under R. O. Ackerley. Before his present appointment he was manager of the company's lighting departments in the north-east. He is president of ELFA.

REGIONAL CHAIRMEN

Bath and Bristol

Mr. D. E. Beard, Dip.M.I.E.S., is manager of the Bristol branch of Philips Electrical Ltd. He was previously chairman of the Centre in 1954 and is currently chairman of the South Western Section of the APLE. He has been a member of the IES Council since 1956.

Birmingham

Mr. L. E. Gibbs, Dip.M.I.E.S., is chief lighting engineer for Atlas Lighting Ltd. in the Midlands. He received his training at Loughborough College and with the BTH Co. Ltd. He was appointed a lighting engineer with the Edison Swan company in 1933 and joined the Benjamin Electric in 1939. He has been with Atlas Lighting Ltd. for the last 14 years.

Cardiff

Mr. F. H. Pulvermacher, A.M.I.E.E., began as an assistant electrician to the Old Vic and Sadler's Wells theatres. He joined the North-Met Power Co. in 1932 and in 1948 he was appointed illumination engineer at the head office of the South Wales Electricity Board. He has served the Centre in various capacities and is an officer of the S. Western Section of the APLE.

Edinburgh

Mr. G. E. L. Comrie first became interested in the technical side of lighting in 1935 when he joined Holophane Ltd., and was later appointed sales engineer for Scotland. He was responsible for the activities of the Edinburgh Centre for a number of years and has served both as hon. treasurer and as hon. secretary. He was a vice-president in 1955-56.

Leeds

Dr. D. L. Smare, M.Sc.(Tech.), Ph.D., F.Inst.P., graduated at the University of Manchester. He was on the staff of the Manchester College of Technology until 1948 when he was appointed to his present position as head of the Dept. of Physics and Ophthalmic Optics at the Institute of Technology at Bradford. He is particularly interested in the link between lighting and ophthalmic optics.

Leicester

Mr. A. E. Bird, Dip.M.I.E.S., was educated at Chiswick Grammar School and Acton Technical College. After some years on television research with EMI and Baird Television he joined the lamp works of the BTH Co. Ltd. at Rugby. He moved to the Leicester works in 1945 and is now service engineer with the AEI Lamp and Lighting Co. Ltd. He is a member of the IES Council.

Liverpool

Mr. T. R. Jones served an apprenticeship as an electrical engineer on completion of which he founded the firm of Tom Jones (Electrical Engineers) Ltd. in 1934. He is a founder member of the Liverpool Centre and was previously chairman in 1947. He is a prominent member of the ECA and a past chairman of its Liverpool Branch.

Manchester

Mr. J. D. Ducker, Dip.M.I.E.S., was educated at Douglas (IOM) High School and Greenock Technical College. After serving an engineering apprenticeship he was with the Douglas Corporation Electricty Dept. for some years. He joined the Benjamin Electric Ltd. in 1939 as a lighting engineer. He was a founder member and first chairman of the N. Lancs. Group.

Nottingham

Mr. B. M. Cobbe, B.Sc.(Eng.), A.M.I.E.E., is the divisional electrical engineer, Ministry of Transport and Civil Aviation, North Midlands Division. He graduated at London University and received his engineering training with the Engineering Department of the GPO. He held a number of appointments with the Post Office before joining the MOT in 1947.

Newcastle

Mr. H. Ainsworth, M.I.E.E., entered the electrical industry as an articled pupil. In 1935 he joined the City of Plymouth Electricity Undertaking and in 1945 he was appointed Consumers' Engineer at the Harrogate Corporation. He became commercial engineer of the Harrogate Sub-area on nationalisation. In 1949 he was appointed to his present position as commercial officer to the Wear Sub-area of the NE Electricity Board.

Sheffield

Mr. K. Marshall, Dip.M.I.E.S., joined the Lighting Department of the Sheffield branch of the GEC Ltd. in 1937. He joined Holophane Ltd. in 1956 as their sales engineer in the Yorkshire Area, a position which he still holds. He has served on the Committee of the Sheffield Centre for a number of years.

North Lancashire

Mr. J. C. Topping, Assoc.I.E.E., is the District Commercial Engineer for the Lancaster District of the NW Electricity Board. He served an apprenticeship with T. R. Topping & Son, of Wigan, and later became a partner in that firm. After war service with the RE he joined the Preston District of the NW Board and took up his present appointment in 1955.

Stoke-on-Trent

Mr. H. Short, B.Sc., was educated in Belfast and received his early technical training at the RAF Electrical and Wireless School at Cranwell. In 1954 he joined Siemens in London as a street lighting engineer and the following year he was appointed lecturer-in-charge, BOAC and BEA Aircraft Electrical Apprentices, North Staffordshire Technical College.

Tees-side

Mr. D. Brashaw completed his early education at the Grammar School, Gateshead, and in 1950 began his career in lighting with the Newcastle branch of the GEC Ltd. After a period at the Research Laboratories and head office he returned to the North-East and was appointed manager of the company's Lighting Department, Middlesbrough, in June, 1956.

FORTHCOMING EVENTS

LONDON

October 14th

Sessional Meeting.—Presidential Address, "Light and Life," by C. C. Smith. (At the Royal Institution, Albemarle Street, W.1.) 6 p.m.

CENTRES AND GROUPS

October 1st

EDINBURGH.—"Lighting in Moscow," by A. G. Penny. (At the YMCA, 14, South St. Andrew Street, Edinburgh.) 6.30 p.m.

NEWCASTLE-UPON-TYNE.—Chairman's Address, by H. Ainsworth. (At the Lecture Theatre, Grey Hall, Department of Electrical Engineering, King's College, College Road, Newcastle-upon-Tyne, 1.) 6.15 p.m.

SWANSEA.—Chairman's Address, by G. W. E. Timms. (At the Demonstration Theatre, South Wales Electricity Board, The Kingsway, Swansea.) 6.30 p.m.

October 2nd

CARDIFF.—Chairman's Address, by F. H. Pulvermacher. (At the Demonstration Theatre, South Wales Electricity Board, The Hayes, Cardiff.) 6 p.m.

GLASGOW.—"Lighting in Moscow," by A. G. Penny. (Joint Meeting with ASEE.) (At the British Lighting Council, 2, St. Vincent Place, Glasgow, C.1.) 6.30 p.m.

MANCHESTER.—"Lighting in Interior Decoration," by Sir Gordon Russell. (At the Regional College of Art, All Saints, Manchester, 15.) 7 p.m.

October 6th

LEEDS.—"Lighting for Sport," by M. W. Pierce. (At the Yorkshire Electricity Board, Ferensway, Hull.) 6.30 p.m.

October 7th

STOKE-ON-TRENT.—"Modern Lighting and Production," by L. E. Gibbs. (At the North Stafford Hotel, Stoke-on-Trent.) 6 p.m.

October 9th

NOTTINGHAM.—Chairman's Induction and Luncheon. (At the Black Boy Hotel.)

October 10th

LEEDS.—Chairman's Induction and Annual Dinner. (At the Guildford Hotel.) 7 p.m.

SHEFFIELD.—Annual Dinner and Dance. (At Maynard Arms Hotel.)

October 13th

SHEFFIELD.—Chairman's Address, by K. Marshall. (At the Grand Hotel, Sheffield.) 6.30 p.m.

October 15th

NORTH LANCASHIRE.—Presidential Address, by C. C. Smith. (At the Demonstration Theatre, North Western Electricity Board, 19, Friargate, Preston.) 7 p.m.

TEES-SIDE.—"Light and Its Effect on the Development of Mankind," by R. L. C. Tate. (At the Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough.) 6.30 p.m.

October 16th

NOTTINGHAM.—"Underwater Television," by D. Allanson. (At the Electricity Service Centre, Nottingham.) 6 p.m.

October 20th

BATH AND BRISTOL.—"Lighting in Relation to Modern Ceilings and Roofs," by Derek Phillips. (At the Building Centre, Bristol.) 7 p.m.

October 21st

LIVERPOOL.—Chairman's Address, by T. Jones. (At the Merseyside and N. Wales Electricity Board Industrial Development Centre.) 6 p.m.

October 27th

LEICESTER.—"Shop Lighting," by J. R. Just. (At the Demonstration Theatre, East Midlands Electricity Board, Charles Street, Leicester.) 7 p.m.

October 31st

BIRMINGHAM.—"Modern Trends in Industrial Lighting," by J. B. Lancaster. (At Regent House, St. Phillips' Place, Colmore Row, Birmingham.) 6 p.m.

Book Review

"Underground Lighting in Mines, Shafts and Tunnels," by A. Roberts. Pp. 292, *Plates* 63, *Figs.* 131, *Tables* 15. *Published by The Technical Press Ltd., London,* 1958. *Price* 63*s.*

This is a text-book for all those interested in the field of underground lighting, although the author himself explains that it is not so much directed to the lighting specialist, but rather to the many others who may be concerned with the subject in any way.

The contents are divided into three main sections covering Fundamentals, Lighting Problems and Lighting Equipment respectively, the latter including both mains-fed and portable apparatus. The author has drawn to a great extent from the published work of many authorities in the field of lighting, photometry and ophthalmology, and much of his own work which has previously appeared in a variety of technical journals is also included. In view of the author's great interest in the subject, it is natural that the major part of the lighting problem and equipment sections should be devoted to mine lighting, although tunnel and subway lighting is also considered in some detail. The section dealing with the construction of flameproof equipment is not entirely up to date, since it makes reference to the 1946 issue of BS229; however, this is probably explained by the fact that the book was in hand before the publication of BS229: 1957. Each chapter includes a comprehensive bibliography. The book is well produced and is an extremely good guide to an important lighting subject. D. A. S.

Situations

Vacant

Northampton College of Advanced Technology, London Department of Applied Physics, St. John Street, E.C.1. — RESEARCH ASSISTANT. Applications are invited for a research assistant for work on the establishment of a scale of subjective brightness which is of importance in illuminating engineering. The work will be concerned with photometry and physiological optics. The applicant should have an honours degree in physics or equivalent qualifications. The work should lead to a higher degree. A limited amount of demonstrating work will be required, but this will not amount to more than six hours per week. The remuneration, including payment for teaching assistance, amounts to £400-£500 per annum. Applications should be sent to the Head of the Department of Applied Physics, as soon as possible, from whom further particulars can be obtained.

Ekco-Ensign Ltd. require an experienced LIGHTING ENGINEER at their Birmingham office. He should have completed National Service and be conversant with modern lighting planning and equipment. Apply Senior Lighting Engineer, 45 Essex Street, Strand, W.C.2.

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SALES AGENTS required by Electric Lamp and Industrial Fittings Manufacturers. Areas available in the Midlands, Home Counties, Yorkshire, Lancashire and Scotland. Applicants must have first class connections with industry and electrical trade. Only well established firms or individuals considered. For full details write Box No. 590.

D.R. Illuminations, Warren Street, Stockport, require a LIGHTING SALES ENGINEER as Manager for their expanding company, selling patentees' festoon lighting systems, tableaux and illuminated features to seaside resorts, hotels, town councils, etc. Salary approx. £1,000 per annum. Car owner an advantage. Please write, giving full details of age, experience, etc.

POSTSCRIPT By 'Lumeritas'

AFTER the almost startlingly surprising view of fluorescent lighting which I mentioned towards the end of my comments last month, I was able to register only mild surprise when my attention was drawn to a paragraph in a privately circulated "News Letter" and which I now quote in full. "What happens at the Ministry of Health when a radical change like fluorescent lighting is introduced? Do they make tests sufficient to convince themselves that people will suffer no injury that will result in increased costs to the National Health Service? Our impression is that fluorescent lighting causes severe eyestrain and many who work at desks all day prefer to struggle with poor daylight rather than suffer the glare from fluorescent tubes. What do ophthalmic specialists have to say about it? In every way it is in the national interest that we should be fit; eyestrain quickly becomes nervous strain with headache and general debility —a condition beloved of germs and bugs. Many scientific developments achieve a given end, but the specialist has seen his objective out of relation to all the issues involved and the price in human count is great." Now, the operative word in this interrogatory and accusatory paragraph seems to be "glare" but it is uncertain—as is often the case—what the writer really means by this. However, nothing that "glare" is likely to mean in this context is unavoidable with fluorescent lighting, although it must be conceded that it is not avoided in some instances.

THE influence of levels of illumination upon visual acuity, as measured by the smallness of the detail that can be distinguished, has been the subject of investigation at different times in a number of countries. Two of the best—perhaps *the* two best—of such studies are those made in our own country by Lythgoe nearly 30 years ago and by Foxell and Stevens quite recently. Acuteness of vision varies, however, in other respects, for example, the precision of stereoscopic perception, and this form of acuity is one of the factors affecting proficiency in some practical tasks. I understand that Soviet scientists have recently studied the influence of different levels of illumination upon stereoscopic acuity and have found that this visual capacity varies with illumination to a more marked extent than do other visual capacities. Another Soviet investigation has shown that the level of illumination affects the training time required for the development of speed and precision in performing the movements required for particular tasks: the higher the illumination (up to what limit I do not know) the sooner and more precise is said to be the development of automatism of complex motor habits. This, of course, is the sort of thing we should expect: fumbling occurs when the light is not good enough for us to see what we are doing or trying to do, but we can go straight to the point when it is clearly revealed to us—unless we are constitutionally ham-handed. So, if training is carried on with poor lighting the acquisition of habits of movement that are wasteful of time and of effort is easy and, once established, such habits may be difficult to correct.

THE IES is to be congratulated upon the design of the programme of meetings for the 1958-59 Session. My copy came to hand early last month and I was at once impressed by the improvement upon previous programmes, which have been rather paltry. Although one of its chief merits is its greater page size, it is just as handy for the pocket as its puny predecessors, besides being more easily readable. Moreover, as a "visual field" it has been designed without any of those typographical eccentricities which are sometimes perpetrated as "contemporary" expressions of the art without proper thought of the mechanics of easy seeing. But, what has happened to the emblem of the Society, with its apt motto "To spread light everywhere"? Has the block been mislaid, or has the IES got a better theme up its sleeve for the Golden Jubilee year? However, between the covers of the programme are listed no fewer than 164 "dates" for members all over the country during the session that opens this month. Is there any other lighting society in the world that can better this?

A YEAR or two back I was taken to task for referring to this time of year as the beginning of "the artificial lighting season", although I cannot remember why the expression I used was objected to. It is certainly undeniable that the daily supply of daylight during the ensuing six months will be so curtailed as to result in a seasonal boom in the use of artificial lighting in places of work, in streets and in homes. As reported at the recent APLE Conference in Harrogate, there is now clear evidence of a substantial decrease in the expected number and also the severity of personal injury accidents on roads where poor lighting has been replaced by Group A lighting. Where good lighting has led to somewhat higher vehicle speeds this has not resulted in more accidents. But on the roads, the artificial lighting season does not mean only that the proportion of journey times spent under public lighting is relatively high, it means also that the proportion of such times when the trail is blazed by vehicle lights alone is high too. And there's the rub. Notwithstanding improvements in vehicle lights (I am almost tempted to say because of them), night driving on unlighted trunk roads can be a severe ordeal, in which the mind has often to guess what the eye is in no state of adaptation to see. As for places of work, there can be no doubt—despite my first paragraph—that a great many of them are now much better "'oles" in the artificial lighting season than they were a generation ago. What of homes? Well, some are "cosy" in artificial lighting, a few are "glamorous", most are "subtopian" and some are hideous. What a field there is here for improvement in lighting—yes, even where the "tele" rules the roost!

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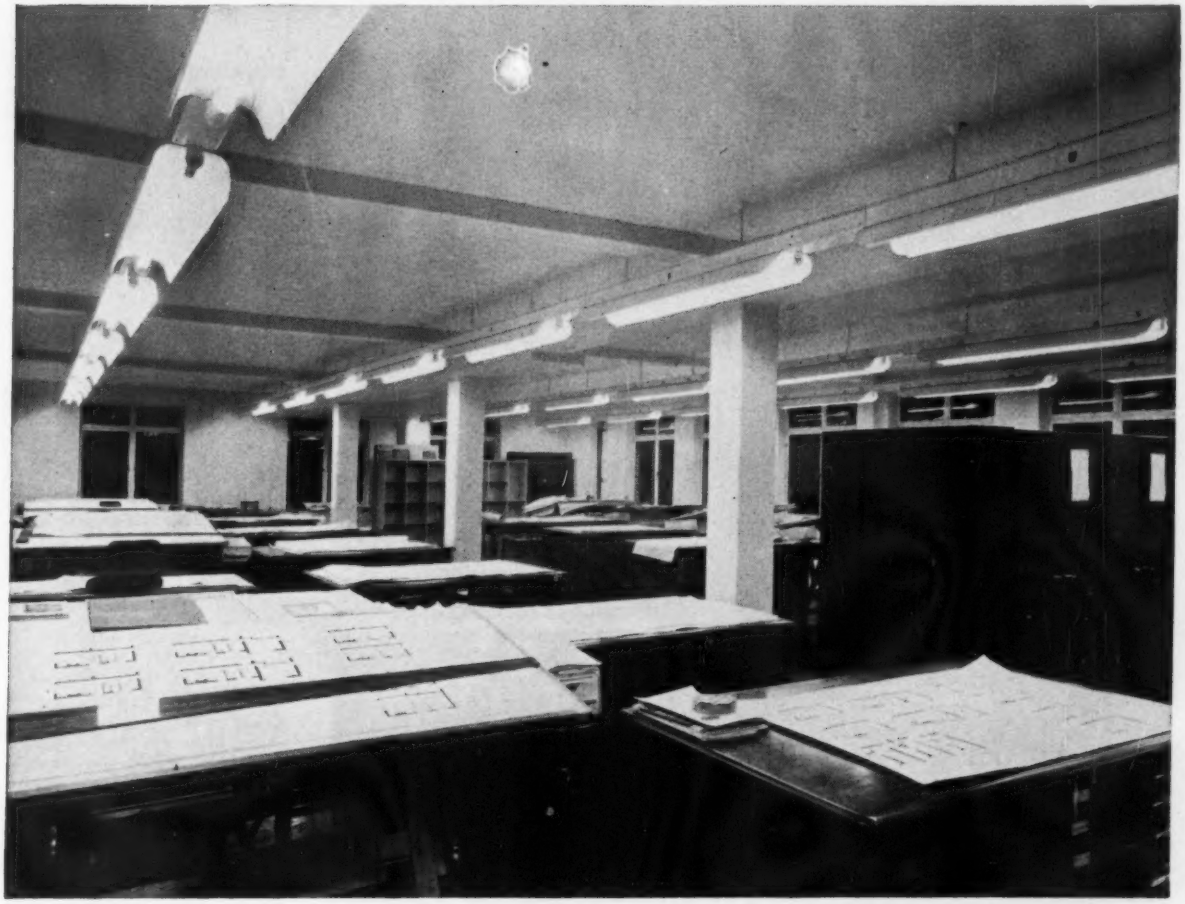

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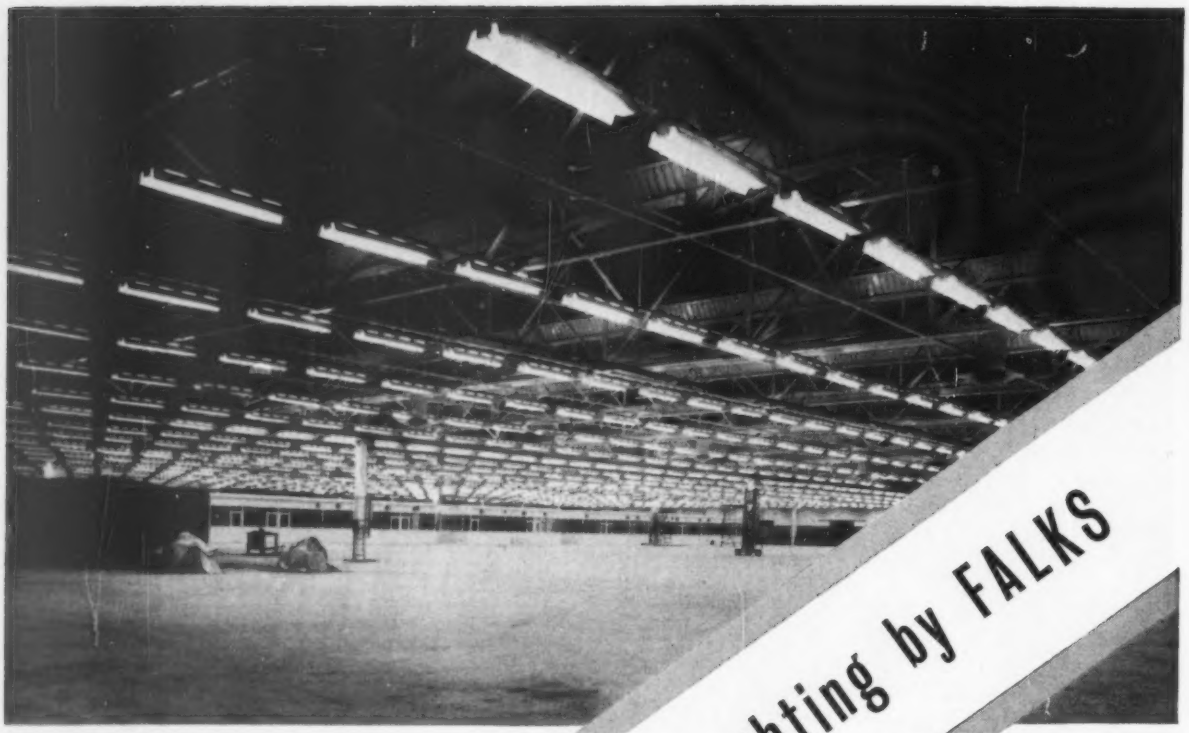

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AP20

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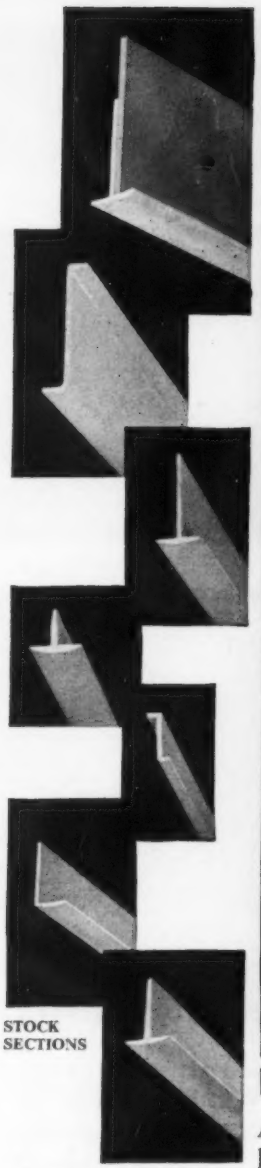
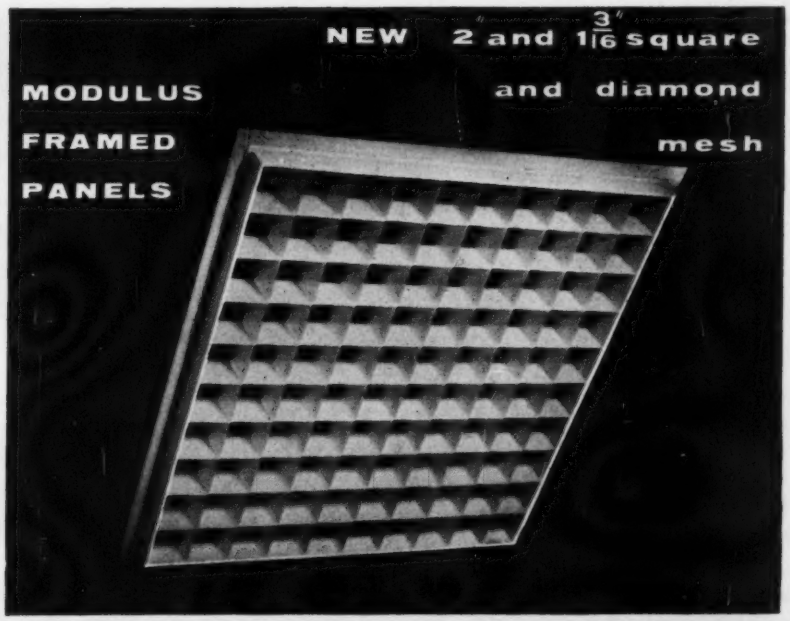
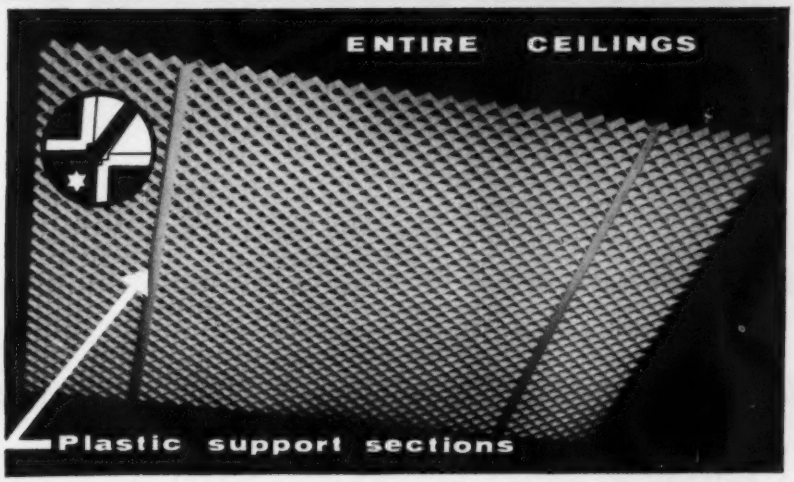


STOCK SECTIONS





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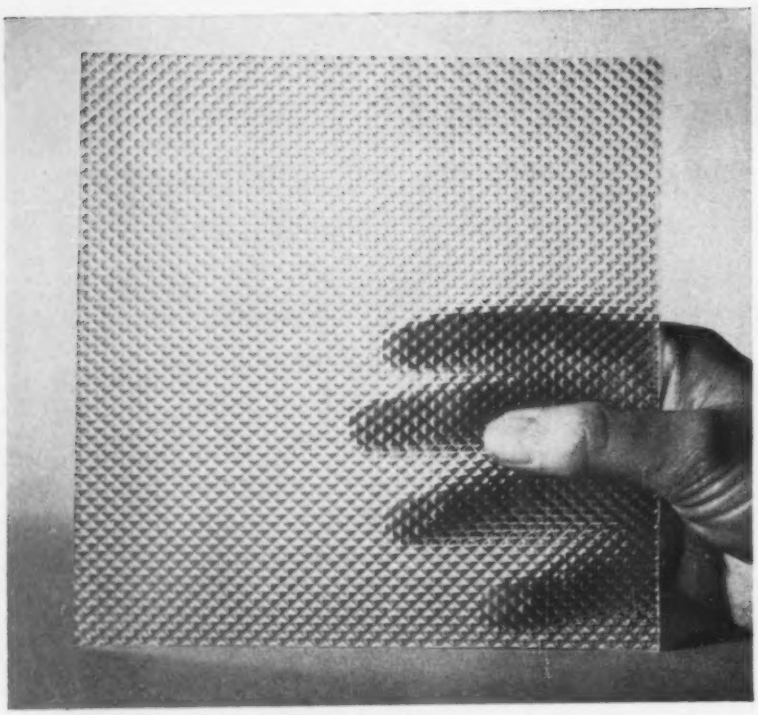
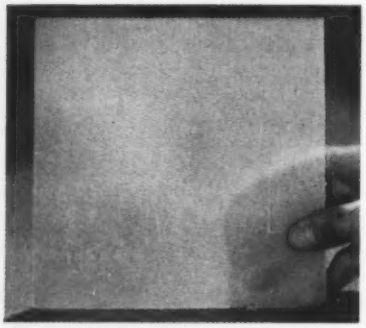
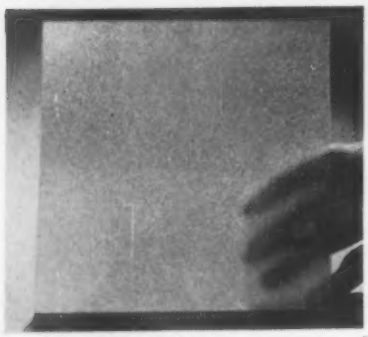


CLEAR DIAMOND

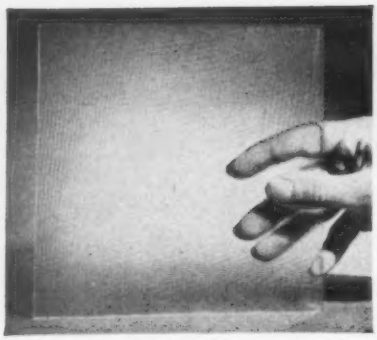
CLEAR STIPPLE



OPAL PIN SPOT



OPAL STIPPLE



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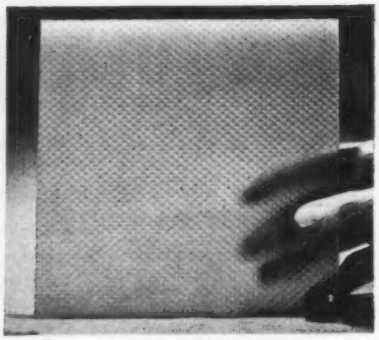

OPAL DIAMOND

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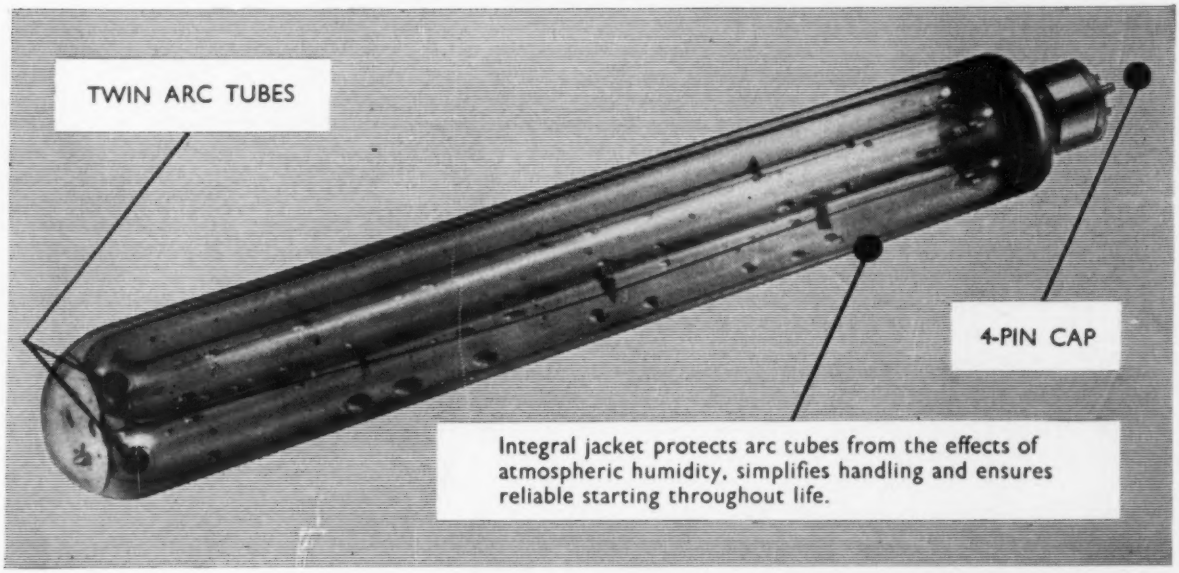
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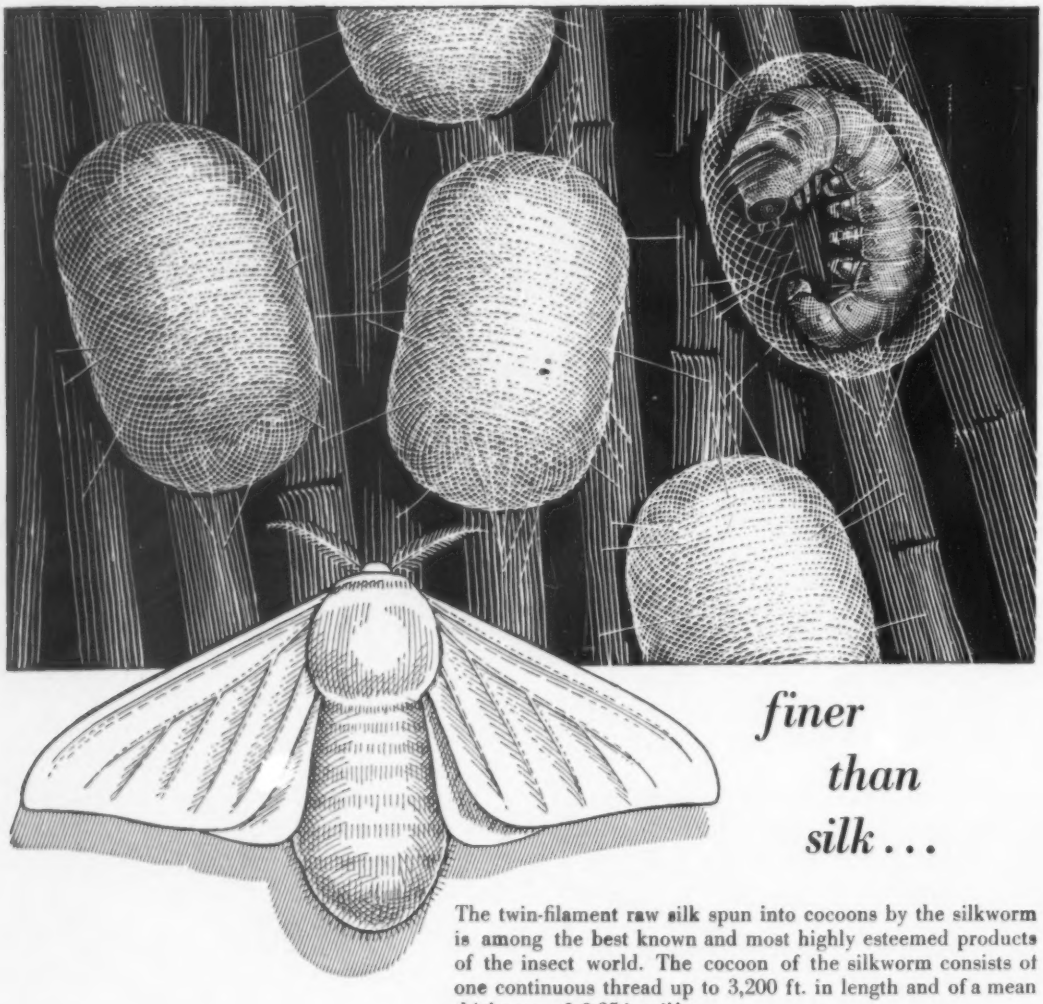

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The Luma Works, the largest Scandinavian producers of incandescent and fluorescent lamps, use tungsten and molybdenum wire-drawing machines which are the "silkworms" of modern engineering.

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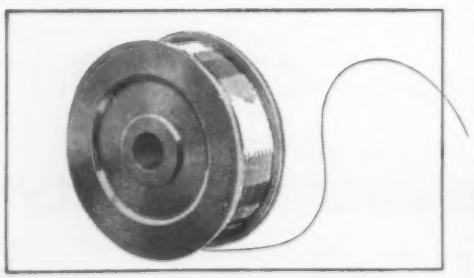
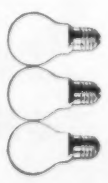
Luma exports 90 per cent of its tungsten and molybdenum wire, and Luma wire is used in radio valves and bulbs in more than 50 countries.

You, too, can get Luma wire in all dimensions and finishes, e. g. black, cleaned or plated, semi-finished rods or finished electrodes.

Write immediately for our new tungsten catalogue in English, French or German.



We manufacture all types of incandescent, mercury vapour, neon and fluorescent lamps, fluorescent fittings and accessories.



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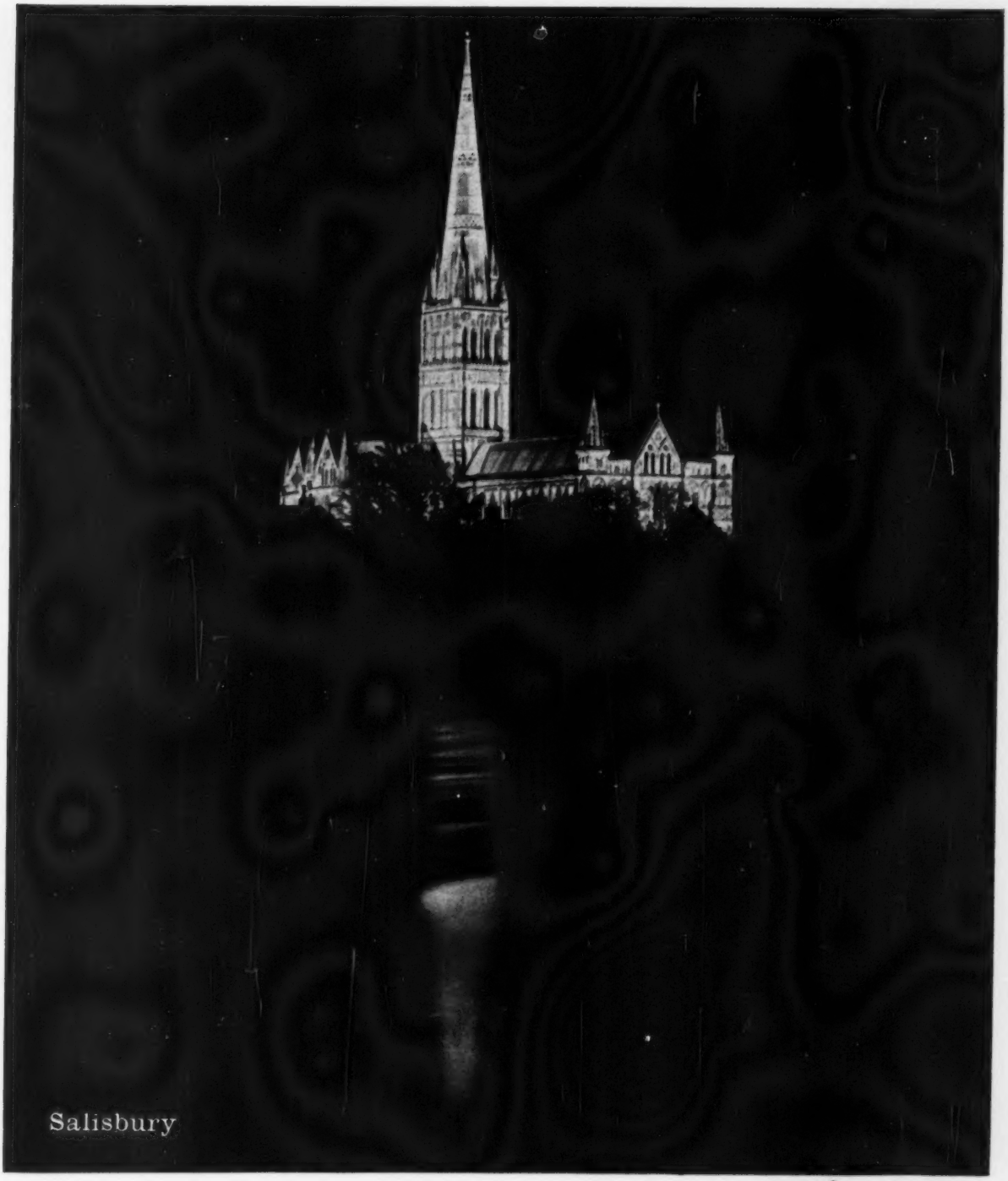

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Published by The Illuminating Engineering Publishing Company Limited, at 32 Victoria Street, London, S.W.1. Printed by Knapp, Drewett and Sons Ltd., 30, Victoria Street, London, S.W.1, England.

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Prestressed Spun Concrete Lighting Columns

Our photograph illustrates the slender appearance of the No. 10 column designed for Group 'B' lighting.

The type shown is part of a wide range of Stanton designs approved by the Council of Industrial Design.

For further information please telephone Ilkeston 86 Extension 44 or write Lighting Column Sales Department.

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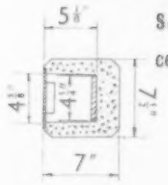
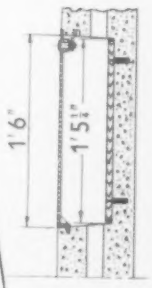
Plastic door (Polyester Resin Glass Fibre) with Yale Type Lock and Universal Key



Section through centre of door box



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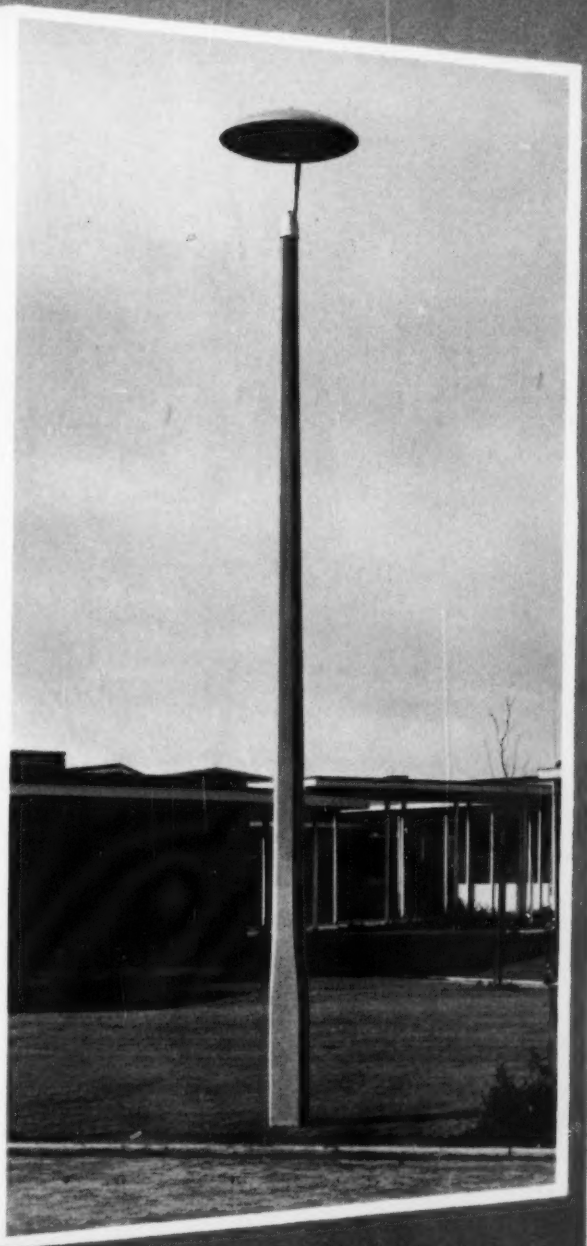

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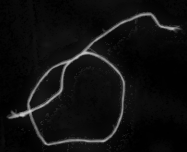
Buying depends on seeing,
Seeing depends on light . . . .
The charm of imaginative lighting,
that is an integral part
of the shop design,
is well illustrated in this
Dolcis interior by Ellis Somake F.R.I.B.A.

Focus on Shop Lighting

BRITISH LIGHTING COUNCIL
better light BLC better sales
SHOP LIGHTING CAMPAIGN

While some shops in our town and city centres have always been lit as well as any in the world, there are still too many others where modern equipment and the important part light has to play in efficiency, hygiene and decoration are not appreciated.

Here is a vast field for lighting improvement and this winter one of the major activities of the British Lighting Council will be a Campaign for better shop lighting.

All branches of the lighting industry are giving their support and there is every reason for supposing that the coming months will mark the beginning of a long overdue revolution in the lighting of small shops all over the country.

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